**University of Alberta**

# Research Utilization Interventions in Nursing

by

David Scott Thompson

©

A thesis submitted to the Faculty of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Master of Nursing

Faculty of Nursing

Edmonton, Alberta
Fall 2006

Library and Archives Canada

Published Heritage Branch

395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque et Archives Canada

Direction du Patrimoine de l'édition

395, rue Wellington
Ottawa ON K1A 0N4
Canada

*Your file Votre référence*
*ISBN: 978-0-494-22212-6*
*Our file Notre référence*
*ISBN: 978-0-494-22212-6*

NOTICE:
The author has granted a non-exclusive license allowing Library and Archives Canada to reproduce, publish, archive, preserve, conserve, communicate to the public by telecommunication or on the Internet, loan, distribute and sell theses worldwide, for commercial or non-commercial purposes, in microform, paper, electronic and/or any other formats.

The author retains copyright ownership and moral rights in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

AVIS:
L'auteur a accordé une licence non exclusive permettant à la Bibliothèque et Archives Canada de reproduire, publier, archiver, sauvegarder, conserver, transmettre au public par télécommunication ou par l'Internet, prêter, distribuer et vendre des thèses partout dans le monde, à des fins commerciales ou autres, sur support microforme, papier, électronique et/ou autres formats.

L'auteur conserve la propriété du droit d'auteur et des droits moraux qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

---

In compliance with the Canadian Privacy Act some supporting forms may have been removed from this thesis.

While these forms may be included in the document page count, their removal does not represent any loss of content from the thesis.

Conformément à la loi canadienne sur la protection de la vie privée, quelques formulaires secondaires ont été enlevés de cette thèse.

Bien que ces formulaires aient inclus dans la pagination, il n'y aura aucun contenu manquant.

Canada

**Abstract**

Research utilization can improve health care. However, much knowledge informing nursing practice is not research based. I conducted two studies aimed at developing research utilization interventions in nursing: 1) Study 1 was a systematic review of randomized and non-randomized controlled trials evaluating interventions aimed at increasing research utilization in nursing and 2) Study 2 was a content analysis of qualitative data related to research utilization using a theory proposed by Dopson and Fitzgerald (2005). (Study 1) Four studies of low quality were included. Education by local opinion leaders and formation of multidisciplinary committees were effective while educational meetings were ineffective. (Study 2) Nurses sensed and integrated research using passive and interactive processes. Boundaries and internalized practices influenced these processes. Audit and feedback, interactive education, and local opinion leaders may be adapted to these processes. A better understanding of how research is utilized will advance research utilization interventions in nursing.

**Acknowledgements**

I would like to thank the generous support I received from the Centre for Knowledge Transfer, the Province of Alberta, the University of Alberta Faculty of Nursing and the Registered Nurses Association of Ontario.

I would like to acknowledge the Canadian Institute of Health Research and the Alberta Heritage Foundation for Medical Research for funding the original study from which my data originated.

I would like to thank Dr Carole Estabrooks for allowing me to use this data.

I would like to express my sincere gratitude to my thesis supervisor and committee for their incredible intellectual generosity:

Dr Carole Estabrooks for always making time to point me in the right direction.

Drs Katherine Moore and Trish Reay for patiently teaching me new perspectives.

**Dedication**

*For my parents who taught me to value education and discovery.*

*For my wife who shares the same values.*

## Table of Contents

**Chapter 1: Introduction**

Background.....1

Purpose.....8

Research Questions.....8

Design.....8

Overview of Studies 1 and 2.....8

Theoretical Framework.....10

Framework for Developing a Research Utilization Intervention.....13

Combining Frameworks.....14

Methods.....14

Summary.....17

References.....18

**Chapter 2: Study 1-Interventions Aimed at Increasing Research Use in Nursing: A Systematic review.**

Introduction.....24

Methods.....25

Results.....28

Discussion.....33

Limitations.....40

Recommendations.....40

Conclusion.....43

References.....44

**Chapter 3: Study 2-A Content Analysis to Begin Preliminary Work on Developing Research Utilization Interventions in Nursing**

Introduction.....65

Purpose.....67

Theoretical Framework.....67

Methods.....68

Findings.....71

Interpretation of Findings.....82

Discussion.....85

Limitations.....91

Conclusion.....91

References.....92

**Chapter 4: Overview of Results**

Overview of Results.....103

Discussion.....106

Contribution.....112

Limitations.....114

Conclusion.....115

References.....116

## List of Tables


Table 1-1 Definitions of Dopson and Fitzgerald's (2005) Processes.....12

Table 2-1 Methodological Quality of Included Studies.....52

Table 2-2 Outcome Measure and Classification of Research Utilization Interventions.....53

Table 2-3 Effect of Interventions on Research Use.....55

Table 2-4 Characteristics of Included Studies and Detailed Description of Interventions.....56

Table 3-1 Interpretations of Processes Identified by Dopson and Fitzerald.....98

Table 3-2 Examples of Categorized Data.....99

## List of Figures

Figure 2-1 Search Strategy by Database.....59

Figure 2-2 Search and Retrieval Process.....64

## Chapter 1: Introduction

### Research Utilization Interventions in Nursing

This thesis is an outcome of my masters program of research in nursing and research utilization. My purpose was to begin preliminary work on developing research utilization interventions in nursing. I undertook the research as two projects and have written them as a 'paper based' thesis consisting of two publishable manuscripts. Although the papers stand alone, they are complimentary. The complete thesis document consists of four chapters. In the first chapter (Chapter 1) I review relevant literature to contextualize the papers and provide an overview of the methods. I then present the papers in manuscript format as separate chapters (Chapters 2 and 3). I discuss the findings and contributions in the final chapter (Chapter 4).

### Background

Nurses are expected to provide effective care and contribute to the delivery of efficient heath services. Findings from research can be used at multiple levels within nursing (e.g., policy, education, bedside) to ensure these expectations are realized. However, recommendations from research are consistently unde-rutilized in nursing (Estabrooks, Chong, Brigidear & Profetto-McGrath 2005), as in other health professions (McGlynn et al., 2003). Research utilization interventions have the potential to greatly improve the effectiveness and efficiency of health care in general and nursing care in particular. In this thesis, I examine research on research utilization interventions in nursing and conduct foundational work for future development of research utilization interventions in nursing.

### *Locating and Defining Research Utilization*

In 1979, Weiss noted that "much of the ambiguity in the discussion of research utilization and conflicting interpretations of its prevalence and the routes by which it occurs--derives from conceptual confusion" (Weiss, 1979, p. 427). Twenty years later, Estabrooks (1999) noted little improvement and offered a preliminary empirical conceptualization of research utilization. Despite Estabrooks' proposed conceptualization, as well as other theoretical offerings (Beyer & Trice, 1982; Weiss), the conceptual confusion that Weiss originally noted remains prominent in the nursing literature. This is problematic as investigators are publishing an increasing number of studies examining strategies aimed at improving research utilization by clinicians. In this literature, investigators frequently use terms such as knowledge utilization, research utilization and evidence-based practice interchangeably. It is not surprising that investigators use various concepts as the literature encompasses many different disciplines, each with its own lexicon, research process and knowledge base. However, using undifferentiated concepts in research contributes to questionable reliability and validity (Morse, Hupcey, Mitcham, & Lenz, 1996) and thus complicates interpretations of results.

Currently, there is no commonly agreed upon conceptualization of research utilization and the term is widely applied. Further, related literature is broadly dispersed. Therefore, it is useful to briefly review the terms *knowledge utilization, evidence-based practice* and *research utilization* to define research utilization.

***Knowledge utilization***. The field of knowledge utilization was dispersed throughout a conglomeration of disciplines before developing into a field of its own

through the 1980s and 1990s (Backer, 1991; Larsen, 1980). In its simplest form, "knowledge utilization includes research, scholarly, and programmatic intervention activities aimed at increasing the use of knowledge to solve human problems" (Backer, 1991, p. 226). Early literature describing knowledge utilization is useful to my research because it provides a conceptualization of *how* and *what* knowledge is utilized.

Beginning with the *how*, scholars traditionally assumed knowledge was utilized when it resulted in a traceable decision or course of action (Larsen, 1980). Eventually, this view was broadened to distinguish between two different forms of utilization: *conceptual* and *instrumental*. *Conceptual utilization* refers to changing one's thinking about a particular issue whereas *instrumental* refers to utilization that can be traced to specific events or decisions (Larsen). Beyer and Trice (1982) introduced a third form of utilization: *symbolic utilization*. *Symbolic utilization* refers to the use of knowledge to justify or advance one's particular views (Beyer & Trice, 1982). Stetler (1994) introduced these forms of utilization (instrumental, conceptual, and symbolic) to nursing practice but related them to a subtype of knowledge utilization: *research utilization* (Estabrooks, 1997). My research does not differentiate between the different forms of utilization. Instead, I am concerned simply with the general utilization of knowledge, specifically research knowledge.

Moving to the *what*, the type of knowledge utilized is dependent primarily upon the discipline in question. In nursing, Carper (1978) suggested four types of knowledge are necessary for practice: empirics (science), aesthetics (art), personal, and ethics (moral). Estabrooks et al. (2005) later found support for these forms of knowledge and illustrated the prominent role of aesthetic knowledge, and to a lesser extent empirical

knowledge, in nursing practice. Using Carper's classification, my research is concerned specifically with increasing utilization of empirical (research) knowledge.

***Evidence-based practice.*** The term Evidence-based practice originated in medicine and the work of the evidence-based medicine working group (Evidence-Based Working Group, 1992). The most common definition of evidence-based practice is "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). Evidence-based practice has now moved throughout the health disciplines, nursing included. However, its influence in nursing is not without debate. In nursing, Scott-Findlay and Pollock (2004) recently argued for increased conceptual clarity for the term *evidence* and suggested it be reserved only for findings from empirical research. Estabrooks (1998) also raised key questions surrounding the meaning of evidence-based practice in nursing. She suggested it most accurately referred to practice that incorporated various forms of knowledge, not only research findings. In nursing, evidence-based practice is a form of practice "encompassing not only research findings, but other forms of practice knowledge as well" (Estabrooks, 1998, p. 20).

***Research utilization.*** The field of research utilization originated in health, human services, and education research (Backer, 1991). In nursing, it is commonly traced to the work of Ketefian (1975) and the Conduct and Utilization of Research in Nursing (CURN) project (Horsely, Crane, & Bingle, 1978; Horseley, Crane, Crabtree, & Wood, 1983). Research utilization is more specific than both knowledge utilization and evidence-based practice. It refers to the use of research findings with the goal being to apply findings from scientific research to practice (Estabrooks, 1999). Scholars generally accept there

are three forms of research utilization: instrumental, conceptual and symbolic (Beyer & Trice, 1982; Estabrooks, 1999; Weiss, 1979). Stetler (1994) related these forms to research utilization in nursing and Estabrooks offered a preliminary empirical verification of them in a sample of nurses. Instrumental research utilization refers to the concrete application of research in practice (Estabrooks). Most often this involves using research either to make a decision or carry out an intervention. Conceptual research utilization is the use of research to change one's thinking but not necessarily one's action (Estabrooks). Symbolic research utilization refers to the use of research to influence policies or decisions (Estabrooks).

In summary, knowledge utilization refers to the use of knowledge to solve human problems (Backer, 1991). Different forms of knowledge can be used in different ways. Evidence-based practice involves providing care and making clinical decisions based on a variety of forms of knowledge, one of which is research. Research utilization refers specifically to the use of scientific research findings. My research is concerned specifically with increasing the general use of research in nursing practice.

***Increasing Research Utilization***

It is thought that increasing research utilization by clinicians can make health care more effective and efficient [The Improved Clinical Effectiveness through Behavioural Group (ICEBERG), 2006]. This assumption has resulted in many studies and reviews of guideline implementation and behaviour change interventions in medicine (Bero, Grilli, Grimshaw, Harvey, Oxman, & Thomson, 1998; Grimshaw et al., 2001; Grimshaw et al., 2004). Reviewers consistently report that most interventions are effective some but not all of the time (ICEBERG). However, certain interventions have been shown to be more

effective than others. For instance, audit and feedback, interactive education, and local opinion leaders have all been shown to have some degree of effectiveness (Grol and Grimshaw, 2003).

While contributors to the success or failure of interventions are not well understood, medical investigators have drawn general conclusions on how to improve upon existing evidence. For example, many investigators have called for increased use of theory in intervention development and more robust methods for evaluating interventions (Shojania & Grimshaw, 2005; ICEBERG, 2006). Additionally, investigators have called for tailored interventions specific to settings and practices (Shojania & Grimshaw; Grol & Grimshaw, 2003). However, despite the aforementioned work, research remains slow to enter medical or nursing practice (ICEBERG; McGlynn et al., 2003).

Nursing, like medicine, also struggles with increasing research utilization (Estabrooks et al., 2005; Thompson, McCaughan, Cullum, Sheldon, Mulhal, & Thompson, 2001). Despite over 30 years of research, understanding of how to increase research utilization in nursing remains limited. Similar to medicine, investigators have attributed this to poor use of theory (Titler, 2004) and weak study designs (Estabrooks et al., 2004) and have argued for increased attention to settings and practices during intervention development and implementation (Rycroft-Malone, Harvey, Seers, Kitson, McCormack, & Titchen, 2004; Rycroft-Malone et al., 2002).

Despite several systematic reviews in medicine (Bero et al., 1998; Grimshaw et al., 2001; Grimshaw et al., 2004), I located no systematic reviews of interventions aimed at increasing research use in nursing. Not surprisingly, an increasing number of nurse investigators are generalizing results from systematic reviews in medicine (Bero et al.,

1998; Grimshaw et al., 2001; Grimshaw et al., 2004) to develop interventions aimed at increasing research use in nursing (Cheater et al., 2006; Murtaugh, Pezzin, McDonald, Feldman, & Peng, 2005; McDonald, Pezzin, Feldman, Murtaugh, & Peng, 2005). This is problematic for two reasons. First, the studies from both medicine and nursing have been criticized for similar conceptual and methodological weaknesses. Issues such as undifferentiated concepts, (Estabrooks et al., 2004; Thompson, Estabrooks, & Degner, 2006), poor use of theory (Grol & Grimshaw, 1999; Estabrooks, Thompson, Lovely, & Hofmeyer, 2006), lack of foundational work (Shojania & Grimshaw, 2005; Estabrooks, Wallin, & Milner, 2003) and poor study designs (Eccles, Grimshaw, Campbell, & Ramsay, 2003; Estabrooks et al., 2004) plague both fields. Second, differences in education, role, and social structure exist between physicians and nurses (Cheater et al., 2006; West, Barron, Dowsett, & Newton, 1999). In particular, nurses typically work as salaried employees in hierarchical social structures with less autonomy. Conversely, physicians typically work in more autonomous group practices or in hospitals as attending physicians with privileges (West et al.). Such differences influence how each group uses research and thus how each group may respond to interventions aimed at increasing research use (West et al.). For example, each discipline, because of their respective reward and social systems, would likely respond to regulatory and financial interventions differently. Therefore, it is unclear if generalizing the findings from medical research (without modification) is appropriate in the context of research utilization interventions in nursing.

## Purpose

The purpose of my thesis was to conduct the preliminary work required to develop research utilization interventions in nursing and to do it in such a way that the problems identified above were addressed.

## Research Questions

1. What do we know about research utilization interventions in nursing?
2. How can we modify existing interventions to increase research utilization in nursing?

## Design

Two empirical studies corresponding to the two research questions were written as manuscripts for a paper-based masters thesis.

## Overview of Studies 1 and 2

***Study 1: Interventions Aimed at Increasing Research Use in Nursing: A Systematic review.***

The first study of this thesis was a systematic review of studies evaluating interventions aimed at increasing research use in nursing. With it I addressed the research question: What do we know about research utilization interventions in nursing? Guidelines and resources from the Cochrane Collaboration, Effective Practice and Organization of Care Group (EPOC) (Cochrane Collaboration, 2004) guided the systematic review method and process. The analysis was structured around an intervention classification system developed by the EPOC group (Cochrane Collaboration). I used the results to identify challenges faced by the field and to create a

series of recommendations on how to advance the field of research utilization in nursing. This paper, is under review at *Implementation Science*.

Thompson, D. S., Estabrooks, C. A., Scott-Findlay, S., Moore, K., & Wallin, L. (in review). Implementation Science.

***Study 2: A Content Analysis to Begin Preliminary Work on Developing Research Utilization Interventions in Nursing***

In the second study, I addressed the research question: How can we modify existing interventions to increase research utilization in nursing? I conducted a secondary analysis of transcripts from interviews with nurses and field notes from nurse observations from the Determinants of Research Utilization Studies[1]. First, I categorized data using seven processes embedded within Dopson and Fitzgerald's (2005) findings as a coding scheme. That is, I categorized data based on my interpretation of the processes identified by Dopson and Fitzgerald as fundamental to using research in practice (which I explain in detail in following sections). Second, I analyzed two categories in greater depth to identify themes. I used the two largest categories, and themes from within these categories, to modify three existing interventions (audit and feedback, interactive education and local opinion leaders). This paper is being prepared for submission to the *Journal of Evaluation in Clinical Practice.*

Thompson, D.S., Reay, T., & Estabrooks, C. A. (in progress). Journal of Evaluation in Clinical Practice.

[1] Estabrooks et al. (2004). The Determinants of Research Utilization in Acute Care: Pain Management in Adult and Pediatric Settings. (No. 04-01-TR). Edmonton, AB: Faculty of Nursing, University of Alberta.

## Theoretical Framework

### *Knowledge to Action*

I used the framework embedded in Dopson and Fitzgerald's (2005) *Knowledge to Action* work as a theoretical guide for my qualitative analysis. I chose this theory for three reasons. First, it offered a new perspective on how research is used in practice and I hoped to gain new insight into how to increase research use. Second, it shifted the focus from interventions to contexts. Many have argued that ignoring contextual factors in intervention design is a significant limitation (Rycroft-Malone et al., 2002; Shojania & Grimshaw, 2005) and I aimed to capture contextual elements during intervention development. Third, I sought to explore the feasibility of using Dopson and Fitzgerald's theory to develop research utilization interventions in nursing.

Dopson and Fitzgerald (2005) developed their theory using cumulative results from an amalgamation of 49 qualitative case studies exploring how clinicians implemented research-based practice. The result was a perspective consisting of seven processes thought to be necessary for research utilization to occur (Table 1-1). These were: (a) sensing and interpreting new evidence, (b) integrating new evidence with existing evidence, (c) reinforcing or marginalizing new evidence by professional networks or communities of practice, (d) relating new evidence to the needs of the local context, (e) discussing and debating new evidence with local stakeholders, (f) taking joint discussions about the enactment of new evidence, and (g) changing practice. Dopson and Fitzgerald did not provide explicit definitions of these processes. Therefore, I developed interpretations of each process to use for coding. They are outlined in Table 1-1. Further, while Dopson and Fitzgerald used the term *evidence* to refer to research findings, I use

the term *research*. Hereafter, both *research* and *evidence* are used interchangeably to refer to the findings from research.

The seven processes outlined by Dopson and Fitzgerald (2005) shift perspectives from how research is implemented to how research becomes *actionable* (Dopson & Fitzgerald, 2005). While an *implementing research* approach relies primarily on the search for reliable and context-free interventions, making *research actionable* depends upon context specific processes; processes that are interwoven within groups and their settings. It is these processes which I sought to identify and subsequently use to modify existing interventions.

**Table 1-1: Definitions of Dopson and Fitzgerald's (2005) Processes**

| Process Identified by Dopson and Fitzgerald | How I Interpreted the Processes |
|---|---|
| Sensing and Interpreting new evidence. | Finding and/or becoming aware of new evidence. Identifying the meaning of new evidence. |
| Integrating new evidence with existing evidence. | Combining elements of new evidence with old evidence. Finding a balance between new evidence and old evidence. |
| Reinforcing or marginalizing new evidence by professional networks or communities of practice. | The social influence of colleagues to completely accept, partially accept, partially reject or completely reject interpretations of new evidence. |
| Relating new evidence to the needs of the local context. | Framing new evidence in relation to the actions of the environment. |
| Discussing and debating new evidence with local stakeholders. | Sharing interpretations of new evidence with those who will use the new evidence. |
| Taking joint decisions about the enactment of new evidence. | Combining interpretations of new evidence to identify how to make new evidence actionable. |
| Changing practice. | Altering practice based on new evidence. |

## Framework for Developing a Research Utilization Intervention

### *Medical Research Council (2000) Framework for Developing and Evaluating Complex Interventions*

The Medical Research Council (MRC) (2000), an organization in the United Kingdom that promotes research into health care, proposed a framework for designing and evaluating complex interventions. I used portions of the MRC framework as a general guide to my research, specifically the first two phases (pre-clinical and modeling). The framework consists of five sequential phases thought to improve intervention design and evaluation. The phases include: (a) pre-clinical or theoretical, (b) phase I or modeling, (c) phase II or exploratory, (d) phase III or main trial, and (e) phase IV or long-term surveillance. My research was fit into the *pre-clinical or theoretical* and *modeling* phases.

***The preclinical or theoretical phase.*** During this stage, investigators establish the basis for an intervention (MRC, 2000). This can include reviewing relevant theory and/or evidence to identify the most applicable intervention(s) and determining the most robust design for its evaluation.

***The modeling phase.*** The second stage involves understanding an intervention and its possible effects (MRC, 2000). Methods or activities in this stage include delineating components of an intervention and examining how they will interact to affect outcomes. Modeling may involve, for example, qualitative testing or computer modeling.

***Exploratory trial phase.*** During this stage investigators combine all information to create and test an intervention. Control over the intervention (or components of the intervention) is established, and expected (and unexpected) effects are discovered.

***Main trial phase.*** This is the central step to testing an intervention. During this stage, the intervention is evaluated using the most robust intervention design possible.

***Long term surveillance phase.*** This follows the main trial. During this stage, long-term effectiveness is established and the broader applicability of the intervention is tested.

## Combining Frameworks

My research was located in the *preclinical* and *modeling* phases of the MRC (2000) framework. My systematic review fit into the preclinical phase. I combined the results with the results from existing systematic reviews conducted in medicine (Bero et al., 1998; Grimshaw et al., 2001; Grimshaw et al., 2004) to determine what interventions are most effective. Further, I determined conceptual and methodological weaknesses in the nursing literature. This provided a platform from which to begin to develop a research utilization intervention in nursing.

For the modeling phase, I conducted a secondary analysis of existing qualitative data. For this analysis, Dopson and Fitzgerald's (2005) findings were used as framework informing the modeling phase of the MRC's (2000) framework. From this analysis I was able to identify some social processes that influence how research is used in practice and modify existing interventions (from the preclinical phase) to these processes.

## Methods

### *Study 1: Interventions Aimed at Increasing Research Use in Nursing: A Systematic review.*

I conducted a systematic review of randomized controlled trials (RCT) and controlled before and after (CBA) studies using computerized databases, grey literature,

ancestry searching, key informants and manual searching of journals. I searched Medline, CINAHL, Healthstar, ERIC, Cochrane Central Register of Controlled Trials and Psychinfo from inception to February 2006. Ancestry searches were done on relevant studies and systematic reviews indexed in the Cochrane Database of Systematic Reviews. I searched grey literature using the System for Information on Grey Literature database (SIGLE), the New York Academy of Medicine website and the Sarah Cole Hirsch Institute website. I manually searched the *Journal of Nursing Care Quality, MEDSURG Nursing, Journal of Clinical Nursing,* and *Journal of Gerontological Nursing* from 1990 (or their inception) to 2006 because my database search retrieved the majority of relevant studies from these journals.

RCTs and CBAs in English were included if they examined nurses, an intervention was aimed increasing research use, or study outcomes were linked to research use. I assessed and rated methodological quality using EPOC (Cochrane Collaboration, 2004) tools. I used EPOC extraction tools and dictionaries to extract data on design, subjects, setting, interventions, and outcomes.

***Study 2: A Content Analysis to Begin Preliminary Work on Developing Research Utilization Interventions in Nursing***

I conducted a content analysis (Hsieh & Shannon, 2005) of data collected as a result of multiple ethnographic case studies (Yin, 1994) examining the use of research by nurses in the context of pain management[1]. Data were originally collected from seven units from four tertiary-level hospitals in two Canadian provinces. I analyzed data from one patient care unit. I chose this unit in collaboration with Dr Estabrooks, the primary investigator of the original study. Together, we selected this unit for four reasons: (a) the

researcher who collected the data on this unit provided rich and detailed descriptions, (b) the unit represented a technologically advanced setting with multiple access points to research (i.e., journal clubs, computers with internet, advanced practice nurses, nurse educators, specialty services and nursing and medical students), (c) the unit was located within an organization that exhibited a hierarchical organizational structure and emphasized various roles within nursing (bedside, educator, advanced practice, specialty), and (d) there was a large quantity of data available. We thought these combined factors would provide sufficiently rich data in relation to contextual factors associated with using, or not using, research in practice

Overall I analyzed transcripts from all (n = 6) interviews with nurses and field notes of participant observation (n = 27) (primarily of nurses). The interview transcripts ranged in length from 13 to 23 pages (7,765 to 16,540 words) and the field notes ranged in length from 3 to 27 pages (1,326 to 18,060 words). I conducted the content analysis in two steps.

***Step one of analysis.*** First, under the direction of Dr Estabrooks, I categorized data using the processes embedded within Dopson and Fitzgerald's (2005) findings. That is, I used my interpretations of the seven processes identified by Dopson and Fitzgerald (Table 1-1) to organize the data. I used a method outlined by Hsieh and Shannon (2005) and Mayring (2000) to guide categorization of data. I repeatedly read each transcript and noted the content. After uploading data into N6™, I used a line-by-line process to highlight text I thought related to research utilization. I then coded the highlighted text into the categories derived from Dopson and Fitzgerald's work. This resulted in seven categories of data that corresponded to my interpretation of the processes identified by

Dopson and Fitzgerald. I then examined each category for the amount of data and any recurring themes. From this, I selected the two largest and richest categories to analyze further in the second step of analysis.

***Step two of analysis.*** In the second step of analysis, I analyzed two categories (*sensing and interpreting evidence* and *integrating evidence with existing evidence*) for themes. I conducted this analysis under the supervision of Dr Estabrooks. My analysis was guided by process outlined by Morse and Field (1995). First, I repeatedly read and reflected on the categorized data. From this, I used a line-by-line process to identify themes that linked substantial portions of the categories together. The process involved repeated re-categorization of themes in an attempt to reach Saturation within the confines of a secondary analysis. I followed as closely as I was able to the cognitive processes outlined by Morse and Field: comprehending, synthesizing, theorizing and re-contextualizing.

## Summary

In this research, I focused on research utilization in nursing. Research utilization is a subset of knowledge utilization concerned specifically with empirical findings resulting from research. While there are different forms of utilization, my research concerns overall general use of research findings. Nursing, like other health professions, draws on multiple forms of knowledge. However, it is generally accepted that health care would benefit from clinicians using more research. In the following chapters, I present my work aimed at developing research utilization interventions in nursing.

References

Backer, T. (1991). Knowledge utilization: The third wave. *Knowledge: Creation, Diffusion, Utilization, 12*, 225-240.

Bero, L., Grilli, R., Grimshaw, J., Harvey, E., Oxman, A., & Thomson, M. (1998). Getting research findings into practice: Closing the gap between research and practice: an overview of systematic reviews of interventions to promote the implementation of research findings. *British Medical Journal, 317*, 465-468.

Beyer, J., & Trice, H. (1982). The utilization process: a conceptual framework and synthesis of empirical findings. *Administrative Science Quarterly, 27*, 591-622.

Carper, B. (1978). Fundamental patterns of knowing in nursing. *Advances in Nursing Science*, 1, 13-23.

Cheater, F., Baker, R., Reddish, S., Spiers, N., Wailoo, A., Gillies, C., Robertson, N. et al. (2006). Cluster randomized controlled trial of the effectiveness of audit and feedback and education outreach on improving nursing practice and patient outcomes. *Medical Care, 44*, 542-551.

Cochrane Collaboration. (2004). *Cochrane effective practice and organisation of care review group.* Retrieved August 28, 2005, from http://www.epoc.uottawa.ca/tools.htm

Dopson, S., & Fitzgerald, L. (2005). *Knowledge to action?* Oxford: University Press.

Eccles, M., Grimshaw, J., Campbell, M., & Ramsay, C. (2003). Research designs for studies evaluating the effectiveness of change and improvement strategies. *Quality and Safety in Health Care, 12*, 47-52.

Estabrooks, C. (1997). *Research utilization in nursing: An examination of formal structure and influencing factors.* Unpublished doctoral dissertational, University of Alberta, Edmonton, Alberta, Canada.

Estabrooks, C. (1998). Will evidence-based nursing practice make practice perfect. *Canadian Journal of Nursing Research, 30*, 15-36.

Estabrooks, C. (1999). The conceptual structure of research use. *Research in Nursing and Health, 22*, 203-216.

Estabrooks, C., Chong, H., Brigidear, K., & Profetto-McGrath, J. (2005). Profiling Canadian nurses' preferred knowledge sources for clinical practice. *Canadian Journal of Nursing Research, 37*, 118-140.

Estabrooks, C., Rutakumwa, W., O'Leary, K., Profetto-McGrath, J., Milner, M., Levers, J., et al. (2005). Sources of practice knowledge among nurses. *Qualitative Health Research, 15*, 460-476.

Estabrooks, C., Scott-Findlay, S., Rutakumwa, W., Duan, Q., & Rozanova, J. (2004). *The determinants of research utilization in acute care: Pain management in adult and paediatric settings* (No. 04-01-TR). Edmonton, AB: Faculty of Nursing, University of Alberta

Estabrooks, C., Thompson, D. S., Lovely, J. J., & Hofmeyer, A. (2006). A guide to knowledge translation theory. *Journal of Continuing Education in Health Professions, 26*, 25-36.

Estabrooks, C., Wallin, L., & Milner, M. (2003). Measuring knowledge utilization in health care. *International Journal of Policy Evaluation & Management, 1*, 3-36.

Evidence-Based Working Group. (1992). A new approach to teaching the practice of medicine. *Journal of the American Medical Association, 268*, 2420-2425.

Grimshaw, J., Shirran, L., Thomas, R., Mowatt, G., Fraser, C., Bero, L. et al. (2001). Changing provider behaviour: An overview of systematic reviews of interventions. *Medical Care, 39*, II-2-II-45.

Grimshaw, J., Thomas, R., MacLennan, G., Fraser, C., Ramsay, C., Vale, L., et al. (2004). Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technology Assessment, 8*.

Grol, R., & Grimshaw, J. (1999). Evidence-based implementation of evidence-based medicine. *Journal on Quality Improvement, 25*, 503-513.

Grol, R., & Grimshaw, J. (2003). From best evidence to best practice: effective implementation of change in patients' care. *The Lancet, 362,* 1225-1230.

Horsley, J., Crane, J., Bingle, J. (1978). Research utilization as an organization process. *Journal of Nursing Administration*, July, 4-8.

Horsley, J., Crane, J., Crabtree, M., & Wood, D. (1983). *Using research to improve nursing practice: A guide*. San Francisco: Grune and Stratton.

Hsieh, H., & Shannon, S. (2005). The approaches to qualitative content analysis. *Qualitative Health Research, 15*, 1277-1288.

Ketefian, S. (1975). Application of selected research findings into nursing practice. *Nursing Research, 24*, 89-92.

Larsen, J. (1980). Knowledge utilization. What is it? *Knowledge: Creation, Diffusion, Utilization*, 1, 421-442.

Mayring, P. (2000, June). Qualitative content analysis. *Qualitative Social Research, 1.* Retrieved January 22, 2006, from http://www.qualitative-research.net/fqs-texte/2-00/2-00mayring-e.htm

McDonald, M. V., Pezzin, L. E., Feldman, P. H., Murtaugh, C. M., & Peng, T. R. (2005). Can just-in-time, evidence-based "reminders" improve pain management among home health care nurses and their patients? *Journal of Pain and Symptom Management 29*, 474-488.

McGlynn, E. A., Asch, S. M., Adams, J., Keesey, J., Hicks, J., & DeCristofaro, A. et al. (2003). The quality of health care delivered to adults in the United States. *New England Journal of Medicine, 348*, 2635-2645

Medical Research Council. (2000). *A framework for development and evaluating of RCTs for complex interventions to improve health.* London: Medical Research Council.

Morse, J. M., Hupcey, J. E., Mitcham, C., & Lenz, E. R. (1996). Concept analysis in nursing research: a critical appraisal. *Scholarly Inquiry for Nursing Practice, 10,* 253-277.

Murtaugh, C., Pezzin, L., McDonald, M., Feldman, P., & Peng, T. (2005). Just-in-time evidence based e-mail "reminders" in home health care: Impact on nurse practices. *Health Services Research, 40*, 849-864.

Rycroft-Malone, J., Harvey, G., Seers, K., Kitson, A., McCormack, B., & Titchen, A. (2004). An exploration of the factors that influence the implementation of evidence into practice. *Journal of Clinical Nursing, 13,* 913-924.

Rycroft-Malone, J., Kitson, A., Harvey, G., McCormack, B., Seers, K., Titchen, A., et al. (2002). Ingredients for change: Revisiting a conceptual framework. *Quality and Safety in Health Care, 11*, 174-180.

Sackett, D. L., Rosenberg, W. M., Gray, J. A., Haynes, R. B., & Richardson, W. S. (1996). Evidence based medicine: what it is and what it isn't. *British Medical Journal, 312*, 71-72

Scott-Findlay, S., & Pollock, C. (2004). Evidence, research, knowledge: a call for conceptual clarity. *Worldviews on Evidence Based Nursing, 2*, 69-171.

Shojania, K., & Grimshaw, J. (2005). Evidence-based quality improvement: The state of the science. *Health Affairs, 24*, 138-150.

Stetler, C. (1994). Refinement of the Stetler/Marram model for application of research findings to practice. *Nursing Outlook, 42*, 15-25.

The Improved Clinical Effectiveness through Behavioural Research Group (ICEBERG). (2006, February 23). Designing theoretically-informed implementation interventions. *Implementation Science, 1*. Article 10.1186/1748-5908-1-4. Retrieved August 20, 2006 from http://www.implementationscience.com/content/1/1/4

Thompson, G., Estabrooks, C., & Degner, L. (2006). Clarifying the concepts in knowledge transfer: a literature review. *Journal of Advanced Nursing, 52*, 691-701.

Thompson, C., McCaughan, D., Cullum, N., Sheldon, T., Mulhall, A., Thompson, D. (2001). Research information in nurses' clinical decision-making: what is useful? *Journal of Advanced Nursing, 36*, 376-388.

Titler, M. (2004). Methods in translation science. *Worldviews on Evidence-Based Nursing, 1*, 38-48.

Weiss, C. (1979). The many meanings of research utilization. *Public Administration Review*, September/October, 426-431.

West, E., Barron, D., Dowsett, J., & Newton, J. (1999). Hierarchies and cliques in the social networks of care professionals: Implications for the design of dissemination strategies. *Social Science and Medicine, 48*, 633-644.

Yin, R. (1994). *Case study research: Design and methods* (2nd ed.). Thousand Oaks, CA: Sage.

## Chapter 2: Study 1

### Interventions Aimed at Increasing Research Use in Nursing: A Systematic Review

Nurses constitute the largest group of health care providers and their care influences patient outcomes (Aiken, Clarke, & Slone, 2002; Blegen, Goode, & Reed, 1998; Estabrooks, Midodzi, Cummings, Ricker, & Giovannetti, 2005). This group's size and influence should ensure that health care is effective and efficient. While most nurses align themselves with these intentions, nursing, like other professions, often fails to incorporate research findings (Estabrooks, Chong, Brigidear, & Profetto-McGrath, 2005). Investigators have reported that a lack of research use contributes to as many as 30%-40% of patients not receiving care according to current scientific evidence and that some 20%-25% of patients may receive potentially harmful care (Schuster, McGlynn, & Brook, 1998). In response, much attention has been paid to the development of interventions to increase research use and several systematic reviews have been published (Bero, Grilli, Grimshaw, Harvey, Oxman, & Thomson, 1998; Grimshaw et al., 2001; Grimshaw et al., 2004). However, studies in these reviews focus primarily on interventions aimed at guideline implementation among physician procedures.

While physicians and nurses experience similar challenges in incorporating evidence, there are differences that influence how each group uses research in practice. A key issue is the social structure of the two professions. Nurses typically work in hierarchical social structures as salaried employees. Conversely, physicians typically work in more autonomous group practices or in hospitals, not as salaried employees, but as attending physicians with privileges (West, Barron, Dowsett, & Newton, 1999). Therefore, results from existing reviews may not transfer readily to nursing practice. The

purpose of this systematic review was to assess the evidence on interventions aimed at increasing research use in nursing practice.

## Methods

### *Search Strategy*

In consultation with a Library Information Specialist familiar with the field, I searched Medline, CINAHL, Healthstar, ERIC, Cochrane Central Register of Controlled Trials and Psychinfo from inception to February 2006 (Figure 2-1). Ancestry searches were done on relevant studies and systematic reviews indexed in the Cochrane Database of Systematic Reviews. I searched grey literature using the System for Information on Grey Literature database (SIGLE), the New York Academy of Medicine and the Sarah Cole Hirsch Institute. I retrieved the majority of relevant studies from the database search from the *Journal of Nursing Care Quality, MEDSURG Nursing, Journal of Clinical Nursing* and *Journal of Gerontological Nursing*. I manually searched these journals from 1990 (or their inception) to 2006.

### *Inclusion Criteria*

A study was eligible for inclusion if: (a) it was a randomized controlled trial (RCT) or controlled before and after (CBA) design, (b) authors evaluated interventions aimed explicitly at increasing research use or evidence based practice, (c) participants were nurses, and (d) outcomes captured research use. Only studies in English were assessed.

For *criterion a*, I defined RCT and CBA using Cochrane definitions (Cochrane Collaboration, 2004). To meet *criterion b*, investigators must have explicitly stated that the research purpose was to test an intervention aimed at increasing research or evidence

based practice. For *criterion c*, I included registered and student nurses. To meet *criterion d*, investigators must have used an instrument to measure research use or identified how the chosen outcomes represented research use. To identify how an outcome represented research use using a change in provider behavior as an outcome, an investigator needed to explain how the behavior reflected research use. For example, in evaluating the implementation of a clinical practice guideline, the investigator needed to measure all recommended behaviors outlined in the guideline or identify the percentage of recommended behaviors that signified research use.

***Screening Process***

The search resulted in over 8000 titles. I reviewed titles and abstracts and selected studies. Two other reviewers each screened 20% of the titles and abstracts. Inter-rater reliability was greater than 90%. The initial screening process resulted in 117 studies. Manual and ancestry searching produced an additional 21 studies. Further review of the 138 studies narrowed them to 14 and the final result was four studies meeting the inclusion criteria (Dufault, Bielecki, Collins, & Willey, 1995; Hong, Ching, Fung, & Seto, 1990; Tranmer, Lochaus-Gerlach, & Lam, 2002; Tsai, 2003). (see Figure 2-2).

***Methodological Quality***

I evaluated the studies for methodological quality using two tools available from the Cochrane Collaboration Effective Practice and Organization of Care Group (EPOC) (Cochrane Collaboration, 2004). The RCT tool consisted of items related to unit of analysis, power, baseline measure, concealment of allocation, blinded or objective assessment of outcome(s), protection against contamination, reliable outcome(s) and completeness of follow-up. The CBA tool consisted of items related to unit of analysis,

power, baseline measure, comparability of groups, blinded or objective assessment of outcome(s), protection against contamination, reliable outcome(s) and completeness of follow-up. In both tools, unit of analysis errors were determined using the unit of allocation and unit of analysis items. That is, if authors allocated by cluster and analyzed by individual without reporting appropriate statistical measures to account for clustering, I reported unit of analysis errors. If in these cases the authors reported power calculations and did not account for intra cluster correlations, I scored the power calculation item as *done* but accounted for the error in the overall rating. I report results in Table 2-1.

I independently assessed each study and two other reviewers each screened 50% of the studies. Discrepancies were resolved through discussion. Each item was scored in the following way: *Done*; *Not Done*; and *Not Clear*. A quality rating was assigned to each study as *low*, *medium*, or *high* depending whether it scored *done* on 0-4, 5-6, or 7-8 items respectively. Unit of analysis errors and incorrect power calculations were noted. I did not use quality assessment ratings to exclude studies because I sought to explore the general state of the science in this field.

***Data Extraction***

I extracted data from four studies representing five experimental cohorts where an intervention was compared to a control. I independently extracted data from all studies while two other reviewers extracted data from 50% of the studies. Discrepancies between the reviewers were resolved through discussion. I used extraction tools and dictionaries available from EPOC (Cochrane Collaboration, 2004). Data on design, subjects, setting, interventions and outcomes were extracted.

To facilitate comparison and discussion, I classified interventions using an EPOC classification system (Cochrane Collaboration, 2004). Interventions were classified as: educational meetings, multidisciplinary committees and local opinion leaders. The EPOC classification and a description of the intervention are illustrated in Table 2-2. I use only the EPOC classification in the text.

Several studies included in this review reported additional outcomes, for example, on predictors of research use, changes in *knowledge* or *attitudes*, or patient outcomes. These were not extracted or reported on as they are not measures of research *use*.

## Results

### *Methodological Quality of Included Studies*

Overall the studies were of low quality (Table 2-1). Two had unit of analysis errors where the investigators allocated by group but did not account for clustering in the analysis (Dufault et al., 1995; Hong et al., 1990). Of the two studies without unit of analysis errors, the investigators of one allocated by unit and accounted for clustering (Tranmer et al., 2002) while the other allocated and analyzed at the provider level (Tsai, 2003). No power calculations were presented in any studies. Two studies had substantial differences in outcomes prior to the intervention (Dufault et al.; Tranmer et al.). Allocation concealment was not reported in two RCTs (Dufault et al.; Tranmer et al.). None of the investigators used blinded or reliable outcome assessments. The CBA investigators did not protect against contamination of the intervention across study groups (Tsai). However, the RCT investigators all randomized by ward and attempted to protect against contamination (Dufault et al.; Hong et al.; Tranmer et al.). The CBA investigator reported adequate provider follow up (Tsai). However, the RCT investigators

either used non-matched samples (Hong et al.; Tranmer et al.) or did not report on follow up (Dufault et al.).

***Included Studies***

Four studies representing five intervention cohorts in Canada, USA, Taiwan, and Hong Kong met the inclusion criteria (Table 2-2). Three were RCTs (four intervention cohorts) (Dufault et al., 1995; Hong et al., 1990; Tranmer et al., 2002) and one was a CBA (1 intervention cohort) (Tsai, 2003). All studies included nurses from inpatient clinical settings; oncology, medicine, surgery and multiple specialties.

Investigators assessed educational meetings delivered to nurses in three studies (Hong et al., 1990; Tranmer et al., 2002; Tsai, 2003). In one study, the investigators compared two investigator-provided educational interventions to a control (Tranmer et al.). Because these interventions varied in content and duration, I identified this study as having two cohorts. Another study used a combination of local experts and educators to deliver the intervention (Tsai). The third study that assessed educational meetings used local opinion leaders identified by the study participants to conduct a demonstration tutorial which was supplemented with education delivered by a local expert (Hong et al.). The study that did not assess educational meetings investigated the formation of a multidisciplinary team of practitioners and researchers (Dufault et al., 1995). Within this intervention there were components of education and marketing. However, the primary investigators based their conclusions on the entire intervention (the multidisciplinary team) rather than the components, therefore, I did not separate the components of this intervention.

The investigators of three studies used nurse-administered instruments to measure research use. Dufault et al. (1995) used Kim's (1988) 13-item Likert-type scale which asked participant to rate their research utilization competency on a 1-7 scale. Tranmer et al. (2002) used the Research Utilization Questionnaire (RUQ) developed by Champion and Leach (1986, 1989). This 42-item Likert-type questionnaire measured attitudes towards research, access to research, support of the use of research and research use. The questionnaire was divided into corresponding subscales. Because Tranmer et al. reported and analyzed the results of each subscale, I extracted only the data that pertained to the *use of research* subscale. Finally, using an instrument based on her previous work, Tsai (2003) assessed whether research utilization was implemented in nursing practice and to what degree. The instrument consisted of 11 items including one single-choice non multiple-choice and one open-ended question.

In the final study, investigators used self report and participant observation to assess practice compliance with *all* the recommendations from a clinical practice guideline (Hong et al., 1990). This study differed from many of the excluded studies that assessed provider behavior change. Specifically, the investigators linked *all* eight outcomes to the eight practices recommended by the clinical guideline, which was referenced to research, thus supporting that the outcomes reflected research use.

***Excluded Studies***

The final ten studies were excluded for two reasons: uncertainty that the outcomes were measuring research use (Davies et al., 2002; Hodnett et al., 1996; McDonald, Pezzin, Feldman, Murtaugh, & Peng, 2005; Murtaugh, Pezzin, McDonald, Feldman, & Peng, 2005) and interventions not explicitly aimed at increasing research use or evidence

based practice (Feldman, Murtaugh, Pezzin, McDonald, & Peng, 2005; Feldman et al., 2004; Gould & Chamberlain, 1997; Jones et al., 2004; Moongtui, Gauthier, & Turner, 2000; Krichbaum, Pearson, Savik, & Mueller, 2005; Horsley, Crane, & Bingle, 1978).

***Findings***

Methodological weaknesses, varied interventions and outcomes across health contexts, incomplete reporting and the small samples prevented meta-analysis. Instead, I present narrative results. The characteristics and findings of the four studies included in this review are summarized in Table 2-3 and 2-4.

***Educational Interventions***. Two studies representing three cohorts tested the effect of educational interventions on research utilization (Tranmer et al., 2002; Tsai, 2003). Direct or indirect participation in educational interventions did not have an effect on nurses' research utilization. Tranmer et al. measured research use both in nurses who participated and nurses from the same unit as those who participated. The investigators reported that there were no significant changes in research utilization scores in either group. This suggests that educational interventions are ineffective whether a nurse participates directly or indirectly.

Educational interventions of varying content, frequency and duration were also found to be ineffective. Tranmer et al. (2002) reported non significant changes in research utilization scores regardless of whether the intervention was 20 hours and focused on literature critiquing, research design, and protocol implementation or eight hours and focused solely research design and implementation. Tranmer et al. did not report the frequency of their intervention. These results are supported by Tsai's (2003)

study which tested a series of educational strategies focused on research use totaling 65 hours and delivered over eight weeks.

Educational interventions did not have a delayed effect on research utilization. Tsai (2003) measured research use at two points: immediately and six months following the intervention. In both cases there were no significant changes in research utilization. This was supported by Tranmer et al. (2002) who measured research utilization only once but waited for one year following the start of the intervention and also reported non significant results.

In summary, educational interventions of varying content, duration, and frequency do not appear to be effective research utilization interventions in nursing whether nurses are directly or indirectly involved in the intervention. The timing of outcome assessment does not appear to influence the ineffectiveness of educational interventions.

***Educational interventions and local opinion leaders.*** One study (Hong et al., 1990) tested the effect of educational interventions combined with a local opinion leader and found that nurses who attended both the lecture and the tutorial (led by a local opinion leader) reported increased research utilization related to urinary catheter practices. It was not possible to determine whether the positive effect was due to the local opinion leader, the educational intervention, or a combination of both. The intervention consisted of a 30 minute lecture by an educator followed one week later by a demonstration tutorial conducted by a local opinion leader. The length of the demonstration tutorial was not reported. No data were collected during the lapse between interventions. Outcomes were assessed at two points; at two weeks following the intervention and at two months. The authors used a practice survey at two weeks and

direct observation at two months. Longitudinally, education and local opinion leaders appeared to sustain an increase in research utilization.

***Multidisciplinary committees.*** Formation of multidisciplinary committees was found to be effective at increasing nurses' research use related to oncology pain (Dufault et al., 1995). The intervention lasted 28 weeks and was divided into six stages. Each stage was sequential and lasted between two and nine weeks. Stages were constructed around collaboration of members of the multidisciplinary team working to operationalize an existing research utilization process (the Conduct and Utilization of Research in Nursing Project) (Horsley et al., 1978. Unlike the previous interventions, education was not the primary component. Outcomes were assessed at one point using a research utilization scale. The investigators did not report the time period between the intervention and outcome measurement.

### *Summary of Findings*

In summary, the four studies reviewed were of poor quality (Dufault et al., 1995; Hong et al., 1990; Tranmer et al. 2002; Tsai, 2003). The findings do not provide enough evidence to support or refute the benefit of educational interventions for increasing research utilization in nursing. The combination of educational interventions and local opinion leaders may be an effective intervention, as may the formation of multidisciplinary committees.

## Discussion

This review focused on interventions to increase research use in nursing practice. I located four studies that met the inclusion criteria; all of which were of low quality (Dufault et al., 1995; Hong et al., 1990; Tranmer et al. 2002; Tsai, 2003). Clearly, study

design and implementation must improve before one can confidently comment on effectiveness of interventions aimed at increasing research use in nursing practice. In its current state, the literature provides little guidance to individuals charged with increasing research use in nursing practice. In the following sections I relate my findings to current literature and provide a discussion of conceptual challenges, methodological challenges, and recommendations for future research.

***Comparison with Existing Reviews***

Grimshaw and colleagues (Bero et al., 1998; Grimshaw et al. 2001; Grimshaw et al. 2004) published comprehensive reviews of provider behavior change reviews and guideline dissemination strategies. While I was interested specifically in nurses' research utilization and Grimshaw and colleagues (Bero et al.; Grimshaw et al. 2001; Grimshaw et al. 2004) examined broader outcomes (provider behavior change and guideline dissemination), these reviews were all aimed at improving understanding of how to translate research findings into practice where they can be used, for example, to change provider behavior or improve patient outcomes. Grimshaw and colleagues (2001) concluded that interventions with different educational strategies showed mixed effects depending upon a combination of strategies. Findings of the four studies reviewed do not support these results (Dufault et al., 1995; Hong et al., 1990; Tranmer et al. 2002; Tsai, 2003). I found that educational interventions of varying duration, content, and frequency appeared ineffective at increasing research use by nurses. Educational interventions included in this review were small interactive group sessions. In medicine, these types of educational strategies showed the most promise. I found two effective interventions: multidisciplinary committees and local opinion leaders. Grimshaw and colleagues (2001)

also found that multidisciplinary collaboration was effective and that use of local opinion leaders showed mixed effects.

Similarities and differences between these reviews can be attributed to multiple factors. Perhaps the most obvious is in the review methods. Grimshaw and colleagues (2004) derived a single effect size for each of the 235 studies reviewed and summarized the range of effects and median effects across studies for each intervention. In contrast, I was only able to locate four studies and was limited to a narrative analysis based on the number of positive and negative results (vote counting).

A second contrast, and the impetus for this review, are the differences between physician and nursing practice. Although nursing studies are not explicitly excluded from existing reviews (Bero et al.; Grimshaw et al. 2001; Grimshaw et al. 2004), nursing studies represent a small portion and their results may not be captured by the overall conclusions. Moreover, many of the conclusions that Grimshaw and colleagues make are based on physician outcomes such as prescribing behavior, referral practices, and diagnostic ordering. These practices do not typically occur in nursing so results from existing reviews cannot be readily applied to nursing practice.

***Conceptual Challenges***

A major conceptual issue I identified is related to outcome measurement. I excluded multiple studies due to unclear conceptualizations of research use related to outcomes. Investigators have commonly aligned themselves with a model of evidence based practice consisting of five steps: (a) converting information needs to an answerable question, (b) locating the evidence, (c) critically appraising the evidence, (d) implementing the evidence in practice and (e) evaluating care performances (Sackett,

Richardson, Rosenberg, & Haynes, 2000). The decision to exclude studies that did not explicitly measure research use was based on; first, the lack of empirical evidence to support a substantive link between using research (step d) and care performances (step e) and second, the possibility that studies claiming to report on nurses' research use may not be reporting on the same phenomena due to conceptual confusion (Thompson, 2004).

There is uncertainty in the research community about what constitutes an appropriate measure of research use (Donaldson, Rutledge, & Ashley, 2004; Kirchoff, 2004; Titler, 2004). Debate surrounding outcome measures can be attributed to a poor understanding of the conceptual structure of research utilization (Thompson, 2004; Donaldson et al.). Ideally, outcome selection is informed by an explicit conceptualization of research use (Estabrooks, Wallin, & Milner, 2003; Rich, 1997). Only two authors in the review explicated how they conceptualized research utilization (Dufault et al., 1995; Tranmer et al., 2002); both offered different conceptualizations and it was not clear from either how their conceptualization informed outcome selection. Rich (1991) noted that misconceptions of how research-based knowledge enters the decision-making process leads to inaccurate measures of research use. Estabrooks and colleagues suggested that "unresolved measurement challenges present an important and practical problem" to advancing the field of research utilization. My findings support these claims and suggest that such issues persist.

Several conceptualizations of research use are available (Estabrooks, 1999; Rich, 1977, 1991; Weiss, 1979) and include instrumental, conceptual, and symbolic forms. Instrumental use is the concrete application of research; conceptual use is a change in one's perspective but not necessarily one's action; and symbolic use is the application of

research findings to influence decisions. While Estabrooks offered a preliminary empirical verification of these in nursing, little work has been done since and many investigators rely on provider behaviors or patient outcomes as proxies. While this approach may capture changes in behavior or organization of care, it is not a reliable measure of *research use* because not all forms of research use consistently result in visible practice changes.

Drawing from literature on guideline effectiveness, the common assumption that patients will do better if treated according to guidelines based on research has not yet been widely demonstrated (Freemantle, 2001). Clearly investigators are interested in the link between using research in practice and improving patient outcomes. However, establishing this link is best accomplished if we first develop sufficient evidence to support the relationship between specific interventions and research use. From this, we can explore the relationship between effective interventions and patient outcomes. If studies aim to evaluate an intervention to increase research use, outcomes must be structured to capture changes in *research use*. More attention to the fit between study outcomes and the conceptual structure of research use will advance the field by producing more accurate results.

***Methodological Challenges***

The studies were published between 1990-2003. Methodological quality (Table 2-1) was low in all four (Dufault et al., 1995; Hong et al., 1990; Tranmer et al. 2002; Tsai, 2003). The absence of progressive improvement suggests that the field is not developing within nursing as would be expected. I present what I believe are the most urgent methodological challenges facing the field.

***Identification of primary outcomes.*** A primary outcome helps determine the key endpoint signifying the efficacy of an intervention (Freemantle, 2001). Explicit reporting of the primary outcome enables the reader to determine whether or not the study results provide sufficient evidence for an intervention and to whom the study results apply. In this review, I extracted only research use outcomes (i.e., the score of a research utilization questionnaire). However, three investigators in this review also reported outcomes additional to research use and all three assessed *attitude towards research* (Dufault et al., 1995; Tranmer et al. 2002; Tsai, 2003). The relationship between such characteristics and research use is not well supported (Estabrooks, Floyd, Scott-Findlay, O'Leary, & Gushta, 2003). When authors report on multiple outcomes without discussing why particular measures were chosen or what constitutes the primary outcome, it is difficult to interpret study findings in the context of research utilization.

***Use of multiple outcomes.*** The challenge in using multiple outcomes to evaluate research utilization interventions is determining the number that must be changed to indicate effectiveness (Titler, 2004). I excluded many studies due to uncertainty that the investigators were actually measuring research use. In these cases, investigators did not provide rationale or support for multiple outcomes in the context of research utilization. It is challenging to determine whether an intervention was effective at increasing research use if there are sporadic changes in the outcomes. More challenging is determining how many recommendations from clinical practice guidelines must be met to indicate research use and for this review, I included only one study that measured *all* recommended practices (Hong et al., 1990). Measuring all outcomes may not be the most accurate or

feasible approach, especially if guidelines recommend large numbers of practices or procedures.

***Intervention sustainability.*** Two studies (Dufault et al., 1995; Tsai, 2003) measured longitudinal outcomes; one illustrated a benefit of intervention over time (two months) (Dufault et al.) and the other illustrated no effect either immediately or six months following (Tsai). Longitudinal outcome measurements are needed to establish the sustainability of research use. Titler (2004) has described two challenges in assessing sustainability of research utilization interventions: (a) defining the boundary between the end of the intervention phase and the start of the sustainability phase, and (b) timing the outcome measurement to differentiate between sustained improvements and residual effects. Compartmentalizing these stages becomes increasingly challenging when multiple interventions are tested because there may be overlap between interventions. Thus far, the literature on research utilization provides little guidance on the optimal timing or length of outcome measurement for different interventions. Hong et al. (1990) and Tsai did not report why they assessed outcomes at two and six months.

***Unit of analysis errors***. Two RCTS included in this review (Dufault et al. 1995; Hong et al., 1990) had unit of analysis errors (Table 2-1). Unit of analysis errors occur when investigators assign clusters or groups of individuals to a study group (i.e., intervention or control) and then analyze as if each individual had an equal chance of being assigned to either group (Whiting-O'Keefe, Henke, & Simborg, 1984). When this occurs, outcomes for each individual are not independent of others within same group. This is a unit of analysis error because people within clusters share similarities (i.e., burn unit nurses may be more familiar with certain treatments than psychiatric nurses) that

may not be accounted for during analysis. When clustering is ignored, the number of participants required (sample size) is underestimated and the level of study significance (P value) is overestimated resulting in a greater chance of arriving at incorrect results (Gilbody & Whitty, 2002).

## Limitations

My systematic review has some limitations. First, I did not conduct a meta-analysis because of lack of effect sizes and a small size. The method I used (vote counting) is a crude estimate of effectiveness. Second, I used the EPOC classification that was developed for broad use (Cochrane Collaboration, 2004). Its applicability specifically to nursing has yet to be established. Third, the four studies included were all of low quality. Including studies of low quality limits the strength of any positive conclusions drawn. The results should therefore be interpreted *with caution*.

## Recommendations

Based on my findings, I developed a series of recommendations addressing the following topics: outcome measurement, intervention development, and study design and reporting. If implemented, I believe they could advance the study of research utilization in nursing.

### *Outcome Measurement*

A common set of problems are inherent in the instruments used to measure research use in the studies I reviewed and elsewhere. They include lack of theory (measurement or research utilization), lack of construct clarity, lack of psychometric assessment, a presumption of linearity, lack of longitudinal work, and influential yet unacknowledged assumptions (Estabrooks et al., 2003). Such instruments were used in

three studies included in this review (Dufault et al., 1995; Tranmer et al. 2002; Tsai, 2003). Until more reliable and valid instruments are developed, investigators should present explicit statements outlining the conceptual and practical basis for chosen outcomes. Making use of available conceptualizations (Rich, 1977, 1991; Estabrooks, 1999; Weiss, 1979) to operationalize research use would decrease conceptual confusion and increase the validity of study results. At minimum, investigators should include longitudinal outcomes sensitive to the intervention being tested. Repeated longitudinal measurement will advance our understanding of the optimal timing and frequency of outcome evaluation.

***Intervention Development***

Interventions need to be developed using theory (Eccles, Grimshaw, Walker, Johnston, & Pitts, 2005). Explicit use of theory helps link elements associated with the study participants, the intervention, and the setting and offers a framework for generalizing the findings (Improved Clinical Effectiveness through Behavioral Research Group, 2004). Several applicable theoretical perspectives exist. Grol and colleagues (Grol, Wensing, Hulscher, & Eccles, 2005) provided an overview of such theories, Estabrooks, Thompson, Lovely, and Hofmeyer (2005) presented a guide to theoretical perspectives related to knowledge translation, and Estabrooks, Scott-Findlay, and Winther (2004) offered a chapter outlining research utilization models specific to nursing. Examples of theories suitable for use include: Rogers' Diffusion of Innovation (2003) which explains the spread of new ideas; the Promoting Action on Research Implementation in Health Services (PARIHS) Framework (Kiston, Harvey, & McCormack, 1998; Rycroft-Malone et al., 2002) which captures the factors that influence

the uptake of evidence; and Social Capital Theory (Szreter & Woolcock, 2004) which uses bonding, bridging and linking capacities to explain knowledge transfer.

Additionally, investigators in nursing should build on existing evidence. For example, over 15 years ago Hong et al. (1990) illustrated that local opinion leaders combined with education was an effective intervention for increasing research use. These results require further exploration in the context of current health services. Furthermore, Angus, Hodnett, and O'Brien-Pallas (2003) used ethnography to illustrate how contextual factors influence success of an intervention and on a larger scale, Dopson and Fitzgerald (2005) reported similar results. Investigators should build upon these findings, for example, by incorporating contextual elements into intervention design. The Medical Research Council (2000) developed a framework for developing and evaluating complex interventions (Campbell et al., 2000) that included qualitative modeling and exploratory trials for this purpose. Using such a framework could decrease resource expenditure on ineffective interventions and produce more fruitful results.

Investigators need to consider how implicit assumptions influence intervention selection and development. For example, authors have mainly targeted knowledge, attitudes, or behaviors of practitioners (Wensing, Wollerscheim, & Grol, 2006) and have assumed that individual characteristics, such as practitioner knowledge deficit, result in under-utilization of research. However, the effectiveness of such strategies is equivocal (West et al., 1999). Instead, investigators need to broaden efforts and explore additional strategies. For example, the authors of the PARIHS framework (Kitson et al., 1998; Rycroft-Malone et al., 2002) theorized that organizational context is critical to the

successful implementation of research in practice. Such theories should be rigorously evaluated.

***Study Design and Reporting***

Studies in this review were of poor methodological quality. To improve, investigators need to address several areas. First, studies should be designed and analyzed using methods that account for clustering if allocation is done by groups of individuals. Second, allocation procedures should be unbiased (i.e., central randomization) and explicitly outlined in study reports. Third, investigators should clearly describe interventions in study reports. Characteristics such as duration and frequency, deliverer and receiver, and mode of delivery must also be clearly reported. Guidelines such as the Consolidation of Standards for Reporting of Trials (CONSORT) (Begg et al., 1998) or the CONSORT statement for cluster RCTS (Elbourne & Campbell, 2001) should be followed. Future reviews would also benefit from using a common classification system for interventions. I used a classification system proposed by EPOC. However, this approach may require adaptation for use in nursing and this needs to be examined and validated.

## Conclusion

Little is known about how to increase research use in nursing. Local opinion leaders and multidisciplinary committees may be effective strategies. Advancing the field in nursing requires methodological and conceptual advancement. If we aim to establish a link between using research and improved patient outcomes we must first establish what interventions are most effective at increasing research use.

## References


Aiken L. H., Clarke, S. P., & Sloane, D. M. (2002). Hospital staffing, organization, and quality of care: Cross-national findings. *Nursing Outlook, 50*,187-194.

Angus, J., Hodnett, E., & O'Brien-Pallas, L. (2003). Implementing evidence-based nursing practice: A tale of two intrapartum nursing units. *Nursing Inquiry, 10*, 218-228.

Begg, C., Cho, M., Eastwood, C., Horton, R., Moher, D., Olkin, I., et al. (1996). Improving the quality of reporting of randomized controlled trials. The CONSORT statement. *Journal of the American Medical Association, 276*, 637-639.

Bero, L., Grilli, R., Grimshaw, J., Harvey, E., Oxman, A., & Thomson, M. (1998). Getting research findings into practice: Closing the gap between research and practice: An overview of systematic reviews of interventions to promote the implementation of research findings. *British Medical Journal, 317*, 465-468.

Blegen, M., Goode, C., & Reed, L. (1998). Nurse staffing and patient outcomes. *Nursing Research, 47*, 43-50.

Campbell, M., Fitzpatrick, R., Haines, A., Kinmonth, A., Sandercock, P., Spiegelhalter, D., et al. (2000). Framework for design and evaluation of complex interventions to improve health. *British Medical Journal, 321*, 694–696.

Champion, V., & Leach, A. (1986). The relationship of support, availability and attitude to research utilization. *Journal of Nursing Administration, 16*, 19-37.

Champion, V., & Leach, A. (1989). Variables related to research utilization in nursing: An empirical investigation. *Journal of Advanced Nursing, 14*, 705-710.

Cochrane Collaboration. (2004). *Cochrane effective practice and organisation of care review group: Data collection checklist.* Retrieved August 28, 2005, from http://www.epoc.uottawa.ca/tools.htm

Davies, B., Hodnett, E., Hannah, M., O'Brien-Pallas, L., Pringle, D., & Wells, G. (2002). Fetal health surveillance: A community wide approach versus a tailored intervention for the implementation of clinical practice guidelines. *Canadian Medical Association Journal, 167*, 469-474.

Donaldson, E., Rutledge, D., & Ashley, J. (2004). Outcomes of adoption: Measuring evidence uptake by individuals and organizations. *Worldviews on Evidence-Based Nursing, 1*, S41-S51.

Dopson, S., & Fitzgerald, L. (2005). The active role of context. In S. Dopson & L. Fitzgerald (Eds.), *Knowledge to action?* (pp. 79-102). Oxford: University Press.

Dufault, M., Bielecki, C., Collins, E., & Willey, C. (1995). Changing nurses' pain assessment practice: A collaborative utilization approach. *Journal of Advanced Nursing, 21*, 634-645.

Eccles, M., Grimshaw, J., Walker, A., Johnston, M., & Pitts, N. (2005). Changing the behavior of healthcare professionals: The use of theory in promoting the uptake of research findings. *Journal of Clinical Epidemiology, 58*, 107-112.

Elbourne, D., & Campbell, M. (2001). Extending the CONSORT statement to cluster randomized trials: For discussion. *Statistics in Medicine, 20*, 489-496.

Estabrooks, C. (1999). The conceptual structure of research use. *Research in Nursing & Health, 22*, 203-216.

Estabrooks, C., Chong, H., Brigidear, K., & Profetto-McGrath, J. (2005). Profiling Canadian nurses' preferred knowledge sources for clinical practice. *Canadian Journal of Nursing Research, 37*, 118-140.

Estabrooks, C., Floyd, J. A., Scott-Findlay, S., O'Leary, K., & Gushta, M. (2003). Individual determinants of research utilization: A systematic review. *Journal of Advanced Nursing, 43*, 506-520.

Estabrooks, C., Midodzi, W., Cummings, G., Ricker, K., & Giovannetti, P. (2005). The impact of hospital nursing characteristics on 30-day mortality. *Nursing Research, 54*, 74-84.

Estabrooks, C., Scott-Findlay, S., & Winther, C. (2004). A nursing and allied health perspective on knowledge utilization. In L. Lemieux-Charles & F. Champagne (Eds.), *Using knowledge and evidence in health care: Multidisciplinary perspectives* (pp. 242-280). Toronto: University of Toronto Press.

Estabrooks, C., Thompson, D. S., Lovely, J. J., & Hofmeyer, A. (2006). A guide to knowledge translation theory. *Journal of Continuing Education in Health Professions, 26*, 25-36.

Estabrooks, C., Wallin, L., & Milner, M. (2003). Measuring knowledge utilization in health care. *International Journal of Policy Evaluation & Management, 1*, 3-36.

Feldman, P. H., Murtaugh, C. M., Pezzin, L. E., McDonald M. V., & Peng, T. R. (2005). Just-in-time evidence-based e-mail "reminders" in home health care: Impact on patient outcomes. *Health Services Research, 40*, 865-885.

Feldman, P., Peng, T., Murtaugh, C., Kelleher, C., Donelson, S., & McCann, E. (2004). A randomized intervention to improve heart failure outcomes in community-based home health care. *Home Health Care Services Quarterly, 23*(1), 1-23.

Freemantle, N. (2001). Interpreting the results of secondary end points and subgroup analyses in clinical trials: Should we lock the crazy aunt in the attic? *British Medical Journal, 322*, 989-991.

Gilbody, S., & Whitty, P. (2002). Improving the delivery and organization of mental health services: Beyond the conventional randomized controlled trial. *British Journal of Psychiatry, 180*, 12-18.

Gould, D., & Chamberlain, A. (1997). The use of a ward-based educational teaching package to enhance nurses' compliance with infection control procedures. *Journal of Clinical Nursing, 6*, 55-67.

Grimshaw, J., Shirran, L., Thomas, R., Mowatt, G., Fraser, C., Bero, L. et al. (2001). Changing provider behavior: An overview of systematic reviews of interventions. *Medical Care, 39*, II-2-II-45.

Grimshaw, J., Thomas, R., MacLennan, G., Fraser, C., Ramsay, C., Vale, L. et al. (2004). Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technology Assessment, 8*, 1-72.

Grol, R., Wensing, M., Hulscher, M., & Eccles, M. (2005). Theories on implementation of change in healthcare. In R. Grol, M. Wensing, & M. Eccles (Eds.), *Improving patient care: The implementation of change in clinical practice* (pp. 15-40). Edinburgh: Elsevier.

Hodnett, E., Kaufman, K., O'Brien-Pallas, L., Chipman, M., Watson-MacDonell, J., & Hunsburger, W. (1996). A strategy to promote research based nursing care: effects on childbirth outcomes. *Research in Nursing & Health, 19*, 13-20

Hong, S., Ching, T., Fung, J., & Seto, W. (1990). The employment of ward opinion leaders for continuing education in the hospital. *Medical Teacher, 12*, 209-218.

Horsley, J. A., Crane, J., & Bingle, J. D. (1978). Research utilization as an organizational process. *Journal of Nursing Administration, 8*(7), 4-10.

Improved Clinical Effectiveness through Behavioral Research Group. (2004). Designing theoretically-informed implementation interventions. *Implementation Science, 1*(4). Retrieved June 26, 2006, from http://www.implementationscience.com/content/1/1/4

Jones, K., Fink, R., Vojir, C., Pepper, G., Hutt, E., Clark, L. et al. (2004). Translating research in long-term care: Improving pain management in nursing homes. *Worldviews on Evidence-Based Nursing, 1*, S13-S20.

Kim, H. S. (1988). *A study of three approaches to research utilization.* Unpublished manuscript. University of Rhode Island, Kingston, Rhode Island.

Kitson, A., Harvey, G., & McCormack, B. (1998). Enabling the implementation of evidence-based practice: a conceptual framework. *Quality in Health Care, 7*, 149-158.

Kirchoff, K. T. (2004). State of the science of translational research: From demonstration projects to intervention testing. *Worldviews on Evidence Based Nursing, 1*, S6-S12.

Krichbaum, K., Pearson, V., Savik, K., & Mueller, C. (2005). Improving resident outcomes with GAPN organization level interventions... gerontological advanced practice nurses. *Western Journal of Nursing Research, 27*, 322-337.

McDonald, M., Pezzin, L., Feldman, P., Murtaugh, C., & Peng, T. (2005). Can just-in-time, evidence-based "reminders" improve pain management among home health care nurses and their patients. *Journal of Pain and Symptom Management, 29*, 474-488.

Medical Research Council. (2000). *A framework for development and evaluating of RCTs for complex interventions to improve health.* London: Medical Research Council.

Moongtui, W., Gauthier, D., & Turner, J. (2000). Using peer feedback to improve handwashing and glove usage among Thai health care workers. *American Journal of Infection Control, 28*, 365-369.

Murtaugh, C., Pezzin, L., McDonald, M., Feldman, P., & Peng, T. (2005). Just-in-time evidence based e-mail "reminders" in home health care: Impact on nurse practices. *Health Services Research, 40*, 849-864.

Rich, R. (1977). Use of social science information by federal bureaucrats: Knowledge for action vs. knowledge for understanding. In C. Weiss (Ed.), *Using social science in public policy making* (pp 199-233). Lexington: Lexington Books.

Rich, R. (1991). Knowledge creation, diffusion, and utilization. *Knowledge: Creation, Diffusion, and Utilization, 12*, 319-337.

Rich, R. (1997). Knowledge and policy. *The International Journal of Knowledge Transfer and Utilization, 10*(2), 11-14.

Rogers, E. M. (2003). *Diffusion of Innovations.* (5 ed.). New York: Free Press.

Rycroft-Malone, J., Kitson, A., Harvey, G., McCormack, B., Seers, K., Titchen, A., et al. (2002). Ingredients for change: Revisiting a conceptual framework. *Quality and Safety in Health Care, 11*, 174-180.

Sackett, D. L., Richardson, S., Rosenberg, W., & Haynes, R. B. (1998). *Evidence based medicine: How to practice and how to teach EBM.* Edinburgh: Churchill Livingtsone.

Schuster, M., McGlynn, E., & Brook, R. (1998). How good is the quality of health care in the United States. *Milbank Quarterly, 76*, 517-563.

Szreter, S., & Woolcock, M. (2004). Health by association? Social capital, social theory, and the political economy of public health. *International Journal of Epidemiology, 33*, 650-667.

Thompson, C. (2004). Fortuitous phenomena: On complexity, pragmatic radomised controlled trials, and knowledge for evidence-based practice. *Worldviews on Evidence-Based Practice, 1*, 9-17.

Titler, M. (2004). Methods in translation science. *Worldviews on Evidence-Based Nursing, 1*, 38-48.

Tranmer, J. E., Lochhaus-Gerlach, J., & Lam, M. (2002). The effect of staff nurse participation in a clinical nursing research project on attitude towards, access to, support of and use of research in acute care settings. *Canadian Journal of Nursing Leadership, 15*(1), 18-26.

Tsai, S. (2003). The effects of a research utilization in-service program on nurses. *International Journal of Nursing Studies, 40*, 105-113.

Weiss, C. (1979). The many meanings of research utilization. *Public Administration Review, 39*, 426-431.

Wensing, M., Wollersheim, H., & Grol, R. (2006). Organizational interventions to implement improvements in patient care: A structured review of reviews. *Implementation Science, 1*(2). Retrieved June 26, 2006, from http://www.implementationscience.com/content/1/1/2

West, E., Barron, D., Dowsett, J., & Newton, J. (1999). Hierarchies and cliques in the social networks of care professionals: Implications for the design of dissemination strategies. *Social Science and Medicine, 48*, 633-644.

Whiting-O'Keefe, Q., Henke, C., & Simborg, D. (1984). Choosing the correct unit of analysis in medical care experiments. *Medical Care, 22*, 1101-1114.

Table 2-1

*Methodological Quality of Included Studies*

CBA Methodological Quality Assessment Results and Rating

| First Author | Unit of Allocation | Unit of Analysis | Power Calculation | Baseline Measure | Characteristics of Control | Blinded Outcome Assessment | Protection Against Contamination | Reliable Outcomes Measure | Provider Follow Up | Patient Follow Up | Rating |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tsai [14] | Provider | Provider | NC | √ | √ | X | NC | X | √ | n/a | Low |

RCT Methodological Quality Assessment Results and Rating

| First Author | Unit of Allocation | Unit of Analysis | Power Calculation | Baseline Measure | Allocation Concealment | Blinded Outcome Assessment | Protection Against Contamination | Reliable Outcomes Measure | Provider Follow Up | Patient Follow Up | Rating |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dufault [11] | Ward | Provider * | NC | X | NC | X | √ | X | NC | n/a | Low |
| Hong [12] | Ward | Provider * | NC | √ | √ | X | √ | X & NC | NC NMS | n/a | Low |
| Tranmer [13] | Ward | Provider * | NC | X | NC | X | √ | X | NC NMS | n/a | Low |

Note. √ = Done; X = Not Done; NC = Not Clear; * = Unit of Analysis Error

Table 2-2

*Outcome Measure and Classification of Research Utilization Interventions*

| Author Year Country | Study Design | Setting and Specialty | Description of Intervention(s) | Classification Using EPOC Method | Outcome Measure |
|---|---|---|---|---|---|
| Dufault, 1995 United States (Dufault et al., 1995) | RCT | Hospital/ Oncology | Organization of practitioners and researchers aimed at solving a clinical problem using research findings | Multi-disciplinary team | Kim's (1988) Research Utilization Competency Scale |
| Hong 1990 China (Hong et al., 1990) | RCT | Hospital/ Inpatient | In-service education and demonstration tutorial by opinion leader | Educational meetings. Local opinion leaders | Compliance with all clinical practice guideline contents |

| | | | | | |
|---|---|---|---|---|---|
| Tranmer 2002 Canada (Tranmer et al., 2002) | RCT | Hospital/ Medical & Surgical | Workshops about conducting a research study and using the findings | Educational meetings | Champion and Leach (1986,1989) Research Utilization Questionnaire |
| | | | Workshops about research findings | Educational meetings | Champion and Leach (1986, 1989) Research Utilization Questionnaire |
| Tsai, 2003 Taiwan (2003) | CBA | Hospital/ Inpatients | Workshops about research utilization | Educational meetings | Tsai Research Utilization Questionnaire |

Table 2-3

*Effect of Interventions on Research Use*

| First Author | Intervention(s) | Outcome(s) of Interest | Effect of Intervention(s) on Outcome(s) of Interest |
|---|---|---|---|
| Dufault (Dufault et al., 1995) | Multidisciplinary team | 1. Kim's research utilization competency scale | Significant change |
| Hong (Hong et al., 1990) | Educational meetings led by local opinion leader | 1. Proportion of reported catheter practices meeting guidelines recommendations<br>1. Proportion of observed catheter practices meeting guideline recommendations | Significant change<br>Significant change |
| Tranmer (Tranmer et al., 2002) | Educational meetings #1 | 1. Champion and Leach Research Use Questionnaire | No significant change |
| Tranmer (Tranmer et al.) | Educational meetings #2 | 1. Champion and Leach Research Use Questionnaire | No significant change |
| Tsai (2003) | Educational meetings | 1. Tsai Research Utilization Questionnaire. | No significant change |

Table 2-4

*Characteristics of Included Studies and Detailed Description of Interventions*

| First Author | Study Subjects | Deliverer/ Recipient of Intervention | Length of Intervention | Detailed Description of Intervention |
|---|---|---|---|---|
| Dufault (Dufault et al., 1995) | 27 nurses from 4 cancer units | Both nurses and researchers/ nurses | 28 weeks consisting of 6 sequential phases | Nurses and investigators participated in activities related to optimal pain management. The phases included:<br>1. Problem identification and assessment of research bases for utilization<br>2. Evaluation of research relevancy to problem selection, nursing department values, standards and policies, and potential cost and benefit<br>3. Innovation design to meet the needs of the problem within the scope of the research base.<br>4. Actual or construct replication and evaluation of the innovation.<br>5. Decision to adopt, alter or |

| | | | | |
|---|---|---|---|---|
| | | | | reject the innovation.<br>6. Development of means to extend the innovation within and outside of the setting. |
| Hong (Hong et al., 1990) | 220 nurses /255 episodes of care from 3 medical and 3 surgical units | Local opinion leaders and infection control nurses/ Nurses and student nurses | 30 minute lecture and unspecified length demonstration tutorial | Infection control nurses provided lectures on research based practices surrounding catheter care. Local opinion leaders provided demonstration tutorials to group of 6-10 nurses following the lectures. |

| | | | | |
|---|---|---|---|---|
| Tranmer (Tranmer et al., 2002) | 235 nurses from 6 medical/ surgical units | Researchers /nurses | 20 hours for 'high' intervention and 8 hours for 'low' intervention | High intervention: Nurses learned how to review and critique research literature, completed a literature review on a clinical practice, participated in the design of a research study to address the identified clinical problem, and participated in the implementation of the study.<br>Low intervention: Nurses learned about the literature related to a clinical problem and discussed now best to implement the research study. |
| Tsai (2003) | 89 nurses from multiple clinical units | Clinical experts/ nurses | 65 hour workshops delivered over 8 weeks | Research utilization education based research utilization steps:<br>1. Preparation stage<br>2. Confirmation stage<br>3. Comparison and assessment stage<br>4. Decision stage<br>5. Implementation stage<br>6. Evaluation stage |

Figure 2-1

*Search Strategy by Database*

CINAHL (1982-February 2006)

1. exp NURSING CARE/
2. exp NURSES/
3. exp Practice Guidelines/
4. exp AUDIOVISUALS/
5. exp PAMPHLETS/
6. exp "POLICY AND PROCEDURE MANUALS"/
7. exp Nursing Protocols/
8. exp Staff Development/
9. inservice$.mp.
10. exp "Seminars and Workshops"/
11. exp Education, Clinical/
12. exp Clinical Nurse Specialists/
13. exp Nurse Practitioners/
14. exp Staff Development Instructors/
15. exp Nurse Consultants/
16. (chang$ adj2 agent$).mp.
17. (facilitat$ adj2 change$).mp.
18. (coordinat$ adj2 change$).mp.
19. exp Quality Assurance/
20. (critical adj1 appraisal).mp.
21. exp Quality Improvement/
22. exp Reminder Systems/
23. (champion$ adj1 change$).mp.
24. exp "Diffusion of Innovation"/
25. exp Nursing Practice, Research-Based/
26. evidence based nursing.mp.
27. (utilizat$ or utilisa$ or uptake or transfer$ or implement$ or disseminat$ or diffusion$ or translat$).mp.
28. journal club.mp.
29. exp Nursing Practice, Evidence-Based/
30. 1 or 2
31. or/3-23
32. 31 or 28
33. or/24-27
34. 33 or 29
35. 30 and 32 and 34
36. limit 35 to research

Medline (1966-February 2006)

1. exp NURSING/
2. exp NURSES/
3. exp Practice Guidelines/
4. exp AUDIOVISUAL AIDS/
5. exp PAMPHLETS/
6. exp MANUALS/
7. exp CLINICAL PROTOCOLS/
8. exp Inservice Training/
9. seminar.mp.
10. workshop.mp.
11. clinical education.mp.
12. exp Nurse Clinicians/
13. clinical nurse specialist$.mp.
14. exp Nurse Practitioners/
15. nurse educator$.mp.
16. staff instructor$.mp.
17. exp Consultants/
18. exp Nurse Clinicians/
19. (chang$ adj2 agent$).mp.
20. (facilitator$ adj2 chang$).mp.
21. (coordinator$ adj2 chang$).mp.
22. (champion$ adj2 chang$).mp.
23. journal club.mp.
24. exp Quality Assurance, Health Care/
25. exp REMINDER SYSTEMS/
26. exp "Diffusion of Innovation"/
27. exp Evidence-Based Medicine/
28. exp Nursing Research/
29. (utilizat$ or utlisat$ or uptake or transfer$ or implement$ or disseminat$ or diffusion$ or translat$).mp.
30. 1 or 2
31. or/3-25
32. or/26-29
33. 30 and 31 and 32

PsychINFO (1887-February 2006)

exp NURSING/
2. exp NURSES/
3. exp Treatment Guidelines/
4. exp EDUCATIONAL AUDIOVISUAL AIDS/
5. pamphlets.mp.
6. (policy and procedure).mp. [mp=title, abstract, subject headings, table of contents, key concepts]
7. protocol.mp.
8. exp Professional Development/
9. inservice.mp.
10. workshop.mp.
11. seminar.mp.
12. clinical nurse specialist.mp.
13. nurse practitioner.mp.
14. instructor.mp.
15. nurse consultant.mp.
16. (chang$ adj2 agent$).mp.
17. (facilitat$ adj2 chang$).mp.
18. (coordinat$ adj2 change).mp.
19. exp "Quality of Services"/
20. (critical adj1 appraisal).mp.
21. reminder$.mp.
22. (champion$ adj1 change$).mp.
23. diffusion of innovation.mp.
24. exp Decision Making/
25. (research and (utiliz$ or utilis$ or uptake or transfer or implement$ or disseminat$ or translat$)).mp. [mp=title, abstract, subject headings, table of contents, key concepts]
26. (knowledge and (utiliz$ or utilis$ or uptake or transfer or implement$ or disseminat$ or translat$)).mp. [mp=title, abstract, subject headings, table of contents, key concepts]
27. (evidence adj1 practice).mp.
28. journal club.mp.
29. 1 or 2
30. or/2-22
31. 30 or 28
32. or/23-27
33. 29 and 31 and 32

HealthSTAR/Non-medlie (1975-February 2006)

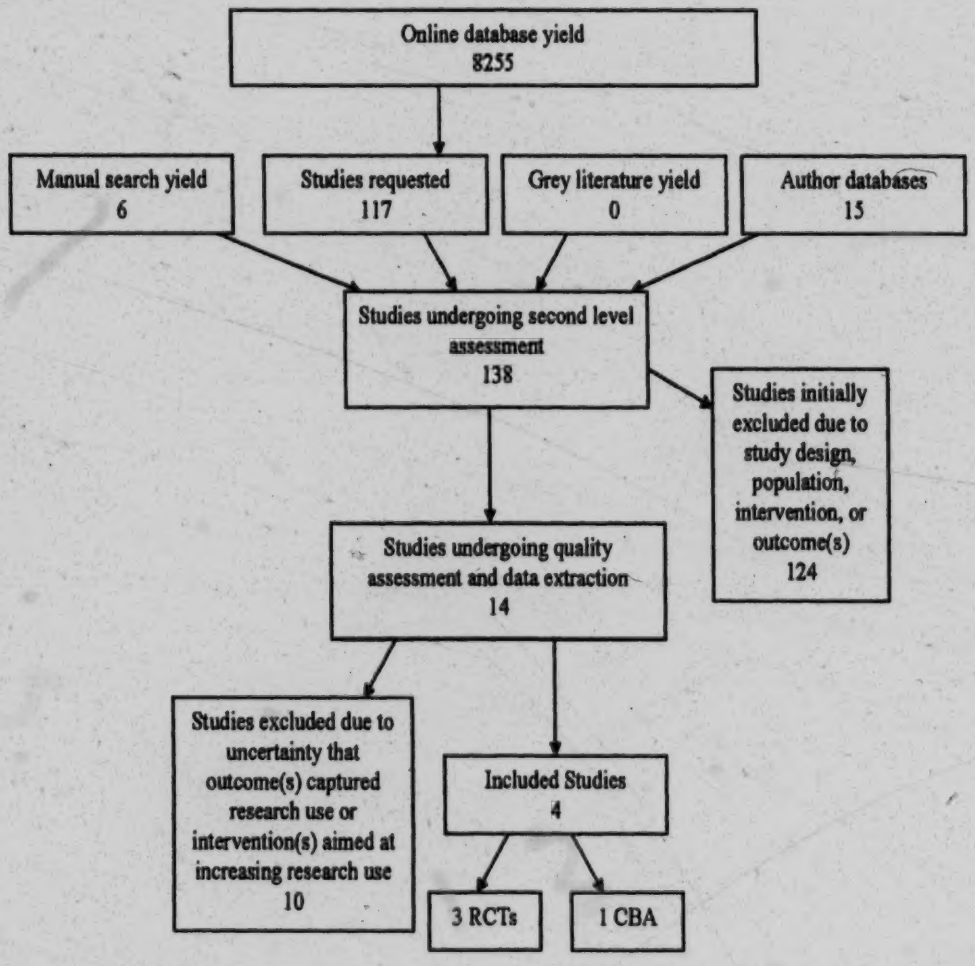
1.exp NURSING/
2. exp NURSES/
3. exp Practice Guidelines/
4. exp AUDIOVISUAL AIDS/
5. exp PAMPHLETS/
6. exp MANUALS/
7. exp CLINICAL PROTOCOLS/
8. exp Inservice Training/
9. seminar.mp.
10. workshop.mp.
11. clinical education.mp.
12. exp Nurse Clinicians/
13. clinical nurse specialist$.mp.
14. exp Nurse Practitioners/
15. nurse educator$.mp.
16. staff instructor$.mp.
17. exp Consultants/
18. exp Nurse Clinicians/
19. (chang$ adj2 agent$).mp.
20. (facilitator$ adj2 chang$).mp.
21. (coordinator$ adj2 chang$).mp.
22. (champion$ adj2 chang$).mp.
23. journal club.mp.
24. exp Quality Assurance, Health Care/
25. exp REMINDER SYSTEMS/
26. exp "Diffusion of Innovation"/
27. exp Evidence-Based Medicine/
28. exp Nursing Research/
29. (utilizat$ or utlisat$ or uptake or transfer$ or implement$ or disseminat$ or diffusion$ or translat$).mp.
30. 1 or 2
31. or/3-25
32. or/26-29
33. 30 and 31 and 32
34. limit 33 to nonmedline

ERIC (1966-February 2006)

1. nurs*.tx
2. (practice guidelines).tx
3. audiovisual.tx
4. (policy and procedure).tx
5. protocol*.tx
6. (staff development).tx
7. (in service).tx
8. seminar.tx
9. workshop.tx
10. (journal club).tx
11. (clinical education).tx
12. (clinical nurse specialist).tx
13. (nurse practitioner).tx
14. instructor.tx
15. consultant.tx
16. (change agent).tx
17. champion.tx
18. coordinator.tx
19. facilitator.tx
20. (clinical educator).tx
21. (quality assurance).tx
22. (critical appraisal).tx
23. (quality improvement).tx
24. (reminder).tx
25. or/2-24
26. 1 and 25

Figure 2-2

*Search and Retrieval Process*



## Chapter 3: Study 2

### A Content Analysis to Begin Preliminary Work on Developing Research Utilization Interventions in Nursing

Research utilization is believed to contribute to effective and efficient delivery of health services. However, despite efforts to improve the use of research in practice, much of the knowledge that informs nursing practice is not research based (Estabrooks, Chong, Brigidear, & Profetto-McGrath 2005; Thompson et al., 2001). Similarly, medicine also suffers from slow uptake of research findings (Chassin & Galvin, 1998; Gross et al., 2001). While both nursing and medicine experience underutilization of research, evaluations of interventions to increase research use have largely targeted guideline implementation or practice change in groups of physicians (Bero et al., 1998; Grimshaw et al., 2001; Grimshaw et al., 2004; Oxman, Thomson, Davis, & Haynes, 1995). Investigators recently conducted a systematic review of systematic reviews on guideline implementation and concluded that most interventions had modest to moderate effects with no intervention being effective in all circumstances (Grimshaw et al., 2001). However, differences in education, role and social structure between physicians and nurses may prevent these and other conclusions from being readily generalized to nursing practice (Cheater et al., 2006; West, Barron, Dowsett, & Newton, 1999).

Information on increasing research utilization in health care, and specifically in nursing, is limited. Further, little progress has been made in understanding why specific interventions fail or succeed (Bonetti et al., 2005). Slow advancement has been attributed to investigators' poor use of theory (Eccles, Grimshaw, Walker, Johnston, & Pitts, 2005; Estabrooks, Thompson, Lovely, & Hofmeyer, 2006) and failure to account for local

conditions such as barriers and facilitators to change (Cheater et al., 2006; Shojania & Grimshaw, 2005). In response, investigators have argued that using theory to develop interventions which match organizational contexts will produce more fruitful results (Shojania & Grimshaw).

Until recently, there was little guidance on how to use theory to develop complex interventions such as those aimed at increasing research use. To address this and other concerns, the Medical Research Council (MRC) (2000) proposed a framework for developing complex interventions. The framework has five sequential phases: (a) pre-clinical or theoretical, (b) phase I or modelling, (c) phase II or exploratory, (d) phase III or main trial, and (e) phase IV or long-term surveillance. To date, research has primarily focused on Phase III (main trial) (Bonetti, et al., 2005). In bypassing the initial stages, many investigators have overlooked the modelling phase; a phase that can enable investigators to map the context and then design an intervention according to variations in setting (Eccles et al., 2005).

Currently, understanding of how to increase research use in nursing is lacking due in part to the questionable generalizeabilty of existing research and the atheoretical approach taken to develop that research. As such, literature offers little guidance to those responsible for selecting and implementing research utilization interventions in nursing. The MRC (2000) framework represents an approach to developing interventions that are both theoretical and specific to nursing. Focusing on the pre-clinical and modelling phases (MRC) of intervention development, I conducted a content analysis to begin preliminary work on the development of a research utilization intervention in nursing.

## Purpose

The purpose of this research was to capitalize on an existing dataset to begin preliminary work on developing research utilization interventions in nursing. The research question was: How can we modify existing interventions to increase research utilization in nursing?

## Theoretical Framework

Dopson and Fitzgerald (2005) recently offered a theoretical perspective that could potentially be used to develop research utilization interventions. Using the cumulative results of 49 case studies exploring how clinicians implemented research based practice, they developed theory explaining how research utilization occurred. The resulting theoretical perspective captured social processes thought to occur when practitioners attempted to use research. Such an approach shifted the focus from how research was implemented to how research becomes actionable (Dopson & Fitzgerald). While an *implementing research* approach relies primarily on the search for reliable and context-free interventions, making *research actionable* depends upon context specific processes; processes that are interwoven within groups and their settings.

Dopson and Fitzgerald (2005) identified seven processes as being fundamental to the utilization of research (Table 3-1). The processes are: (a) sensing and interpreting new evidence, (b) integrating new evidence with existing evidence, (c) reinforcing or marginalizing new evidence by professional networks of communities of practice, (d) relating new evidence to the needs of the local context, (e) discussing and debating new evidence with local stakeholders, (f) taking joint discussions about the enactment of new evidence, and (g) changing practice. Dopson and Fitzgerald did not provide explicit

definitions of these processes. Therefore, I developed interpretations of each process (Table 3-1). Further, while Dopson and Fitzgerald used the term *evidence* to refer to research findings, I use the term *research*. Hereafter, both *research* and *evidence* are used interchangeably to refer to the findings from research.

I chose Dopson and Fitzgerald's (2005) theory for three reasons. First, they offered a new perspective on how research is used in practice. By using a new perspective, I hoped to gain new insight into how to increase research use. Second, their perspective shifted the focus from interventions to contexts. Many have argued that ignoring contextual factors is a significant limitation (Rycroft-Malone et al., 2002; Shojania & Grimshaw, 2005) and I aimed to capture contextual elements during intervention design. Third, I sought to explore the feasibility of using Dopson and Fitzgerald's theory in nursing and specifically in developing a research utilization intervention.

## Methods

I conducted a content analysis of existing data. The data resulted from multiple case studies (Yin, 1994) examining the determinants of research utilization by nurses in the context of pain management (Estabrooks, Scott-Findlay, Rutakumwa, Duan, Rozanova, 2004).

### *Background: Original Study*

My data originated from a study of seven units selected from four tertiary-level hospitals in two Canadian provinces. Data were collected over six months by research associates who were master's prepared registered nurses with research experience. They collected data from several sources including nurses, physicians, allied health workers,

patients, and documents such as meeting minutes and newsletters. The original researchers used a two-fold sampling approach that involved purposive and ethnographic sampling. Individuals were chosen based on willingness to participate, potential as an informant and knowledge of the unit. They sampled until they developed sufficiently rich and saturated descriptions of what influenced research use. Sampling was guided by Morse's criteria of adequacy and appropriateness (Morse & Field, 1995). Ethical clearance for the original study was obtained from the appropriate Institutional Research Ethics Boards and additional ethical clearance was obtained from the University of Alberta for the analysis presented here.

### *Sample*

In the analysis reported here, I selected data from one patient care unit. I selected this unit in consultation with the principal investigator from the original study and based on the suitability of the data to provide answers to my research question. The chosen unit provided a large data set and the richest data in relation to contextual factors associated with using or not using research in practice. I analyzed all transcripts from interviews with nurses (n = 6) and field notes (n = 27) documenting findings from participant observation. The interview transcripts ranged in length from 13 to 23 pages (7,765 to 16,540 words) and the field notes ranged in length from 3 to 27 pages (1,326 to 18,060 words).

### *Data Analysis*

There are many definitions of content analysis (Hsieh & Shannon, 2005; Kassarjian, 1977) and no universal rules on how to use it (Cavanagh, 1997). My analysis was most closely aligned with Hsieh and Shannon's definition of content analysis: "the

subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (p. 1278). I conducted my analysis in two stages which I broadly defined as the *deductive stage* and the *inductive stage*.

***Stage One: Deductive Analysis.***

For the deductive stage, I categorized data under the supervision of members of my thesis committee; one of whom (Dr Estabrooks) was the primary investigator of the original research. To categorize data, I used the processes embedded within Dopson and Fitzgerald's (2005) findings. That is, I categorized data based on my interpretations of the seven processes identified by Dopson and Fitzgerald (Table 3-1). I used a method outlined by Hsieh and Shannon (2005) and Mayring (2000). I repeatedly read each transcript and noted the content. After uploading data into N6™, I used a line-by-line process to highlight text I thought related to research utilization. I then coded the highlighted text into the categories derived from Dopson and Fitzgerald's work. This was an iterative process as I frequently revisited Dopson and Fitzgerald's research, the data, and my descriptive notes. This processes resulted in seven categories of data that corresponded to the processes identified by Dopson and Fitzgerald. I then examined each category for the amount of data and any recurring themes. From this, I selected two categories to analyze further.

***Stage Two: Inductive Analysis.***

Under the direction of members of my thesis committee, I analyzed data within two categories using a process outlined by Morse and Field (1995). First, I repeatedly read and reflected on the categorized data. From this, I used a line-by-line process to identify themes that linked substantial portions of the categories. The process involved

repeated re-categorization of themes in an attempt to reach saturation within the confines of a secondary analysis. I followed (attempted to follow) cognitive processes outlined by Morse and Field: comprehending, synthesizing, theorizing and re-contextualizing.

## Findings

From a total of 221,125 words from six interview transcripts and 27 field notes, I categorized most data into *sensing and interpreting* (990 words) and *integrating new evidence with existing evidence* (646 words) (hereafter referred to as *sensing* and *integrating* respectively). These were followed by *reinforcing or marginalizing new evidence* (162 words), *changing practice* (114 words), and *discussing and debating evidence* (112 words). I found no data that corresponded with *taking joint decisions* or *relating needs to the local context*.

I analyzed the *sensing* and *integrating* categories in more detail for two reasons. First, I aimed to develop full and rich descriptions and they were the largest categories. Second, *sensing* and *integrating* are processes that could be targeted by an intervention to increase research utilization; more so I reasoned than the other categories. In the following sections, I describe the findings from a more detailed analysis of both categories.

### *Sensing Evidence*

In the *sensing* category, passive dissemination strategies were the most common sources of evidence to 'sense'. For example, observations by the data collector reflected passive dissemination such as posting notices about in-services; which I assumed were research based. These posters advertised education aimed at nurses (they were in nursing areas) but delivered by physicians as illustrated by the following field note:

> There are a number of new posters on the board. I notice a poster on bright pink paper advertising an in-service session about "coping with patients who have chronic pain"...the other posters are also advertising various in-service sessions…these sessions are all medically led.

Further, research articles were primarily disseminated passively suggesting that nurses were expected to sense research on their own. The following is a field note that documented a journal club session:

> The article has been posted on the Journal Club bulletin board opposite the med room for anyone to read prior to the journal club meeting. Following the journal club meeting, I ask what happens once the article is reviewed, and the answer is: "it goes back on the bulletin board for a month".

There were also opportunities where nurses could *actively* sense research. These frequently involved groups of both nurses and physicians. A field note documented a conversation where a bedside nurse has the opportunity to *sense* from a specialty nurse:

> H (specialty nurse) tells B (bedside nurse) that looking at vital signs is a good way to assess acute pain and adds: "That's really great B – but that's something we need to look at carefully. Because the patient has some degree of chronic pain, sometimes, it will be hard for us to notice any change in her vital signs"

Opportunities for active *sensing* sometimes illustrated that, while research findings and experience were equally valued as sources of information, passive dissemination was expected. Nurses discussed a new procedure:

G: I heard that people were not doing the test and I was surprised.

K: On admission we are supposed to do it, but it is not continual.

G: A more senior person told me yesterday we were not supposed to do the test.

R: I heard we do it on admission but we stop doing the weekly test.

G: I agree, it should be done according to the study, but we will hear about that.

Sensing new evidence was the largest category. I placed data in this category that I thought related to how nurses become aware of new research. Additional examples of data I categorized as sensing and interpreting are presented in Table 3-2.

### *Integrating Evidence*

I grouped data that reflected how nurses combined (or did not combine) new research with existing research in this category. *Integrating* often occurred through social processes where nurses compared new research to how they or others were currently practising. Nurses discuss research findings surrounding wound care:

> "W was just saying that he found something on the internet where they use (a specific product) directly on the wound." There is a cumulative gasp as people discuss the pain involved in such a process. Q adds "We couldn't possibly use such…" she trails off.

Sometimes nurses used the research to support existing practices. This was evident during assessments when nurses had opportunities to integrate research with practice:

The nurse flips through the chart until she arrives at the scale (which is research based). She goes through the patient's appearance according to the scale and says "she is sort of between categories according to the scale, maybe two or three, see this is the problem with these scales…at least we know that what I think about her pain is consistent with the scale."

In another example with a different nurse:

The nurse explains that there is a (research based) scale used for patients on the unit. She goes through each column, explaining to me where the patient's assessment fits with the scale. I ask her if she has this in mind when she goes into the room. She responds, "no, not really...I don't really use the scale…when I go in, I just know."

However, in other cases, nurses were confident about how they *integrated* research. A nurse discusses how she knew a child was in pain:

Researcher: How do you know whether the crying and screaming is related to the actual pain from (the condition) or whether it is related more to anxiety?

Nurse: I have read enough studies to give me a base idea of what it is like to have the treatment…not that I have ever had (the condition), but there are studies based on what kids describe the pain is like.

*Integrating* was the second largest category. I categorized data which I thought pertained to how nurses combined new research with existing evidence in this category. Additional examples of data are presented in Table 3-2.

### *Themes within Sensing and Integrating Evidence*

Within *sensing* and *integrating*, I found two themes that appeared to influence *sensing* and *integrating*: *boundaries* and *internalized practices*. They were common between the two categories.

#### *Boundaries*

Two forms of professional boundaries appeared to influence *sensing* and *integrating*: boundaries between professions and boundaries within nursing.

***Boundaries between professions.*** Nurses seemed hesitant to sense from physicians. The following series of text highlights how, despite a clinical problem, the nurse did not sense from the physician:

> I (researcher) ask F (nurse) if she will be using anything special to help assess A's (patient) pain. She looks at me slightly puzzled and I add, "Like a pain scale maybe.' She still seems puzzled by my questions. I ask her whether she would use a 1-10 scale in a child A's age. She looks blankly adding, "He is on an epidural – his pain will be blocked"

However, the physician commented to the patient's mother while conducting an assessment:

> Unfortunately, the epidural can only control the pain that comes from the actual surgery – the incision site. This other sort of spasmodic pain – this is something different, and we'll need to use something else to control this.

These comments illustrate the nurse's knowledge gap and a problem related to pain. Although the nurse was present during the conversation, she distanced herself from the discussion and appeared not to *sense* despite the immediate opportunity:

> F (the nurse) starts to position the tubing and monitor wires between the patient's body and the bedclothes. She turns her body toward the monitor and adjusts some of the settings… F is focussed on adjusting the oximeter probe.

The following comments by a clinical nurse specialist support these observations. The nurse specialist discussed how nurses do not engage with medical staff during pain service rounds:

> They (the nurses) come in the room with you or they say, "Oh, no, no, I'm fine," and then they'll show up in the room and they'll stand there. They'll check their pumps or they'll write a few numbers down.

The above excerpts highlight how professional boundaries may have prevented nurses from *sensing* and *integrating* research.

***Boundaries within professions.*** I identified boundaries between new staff (both newcomers to the profession and to the unit) and veterans. Many new nurses brought research based practice to the unit:

> I: When you trained, did they have some sort of input with the need for evidence in practice and that sort of thing?
>
> P: Well, in school it was certainly a real push, a demand. But I think that's just the way nursing is moving, as a whole, and the hospital as a whole supports that.

I: So do you think that's made a difference to the way you approach practice?

P: Uh-hm, it makes you a lot more receptive to change and not as defensive.

These comments illustrate how nurse educators prepare new graduates to use research in practice. However, when new graduates begin work and attempt to use their skills, they are met with opposition. The same nurse elaborated on receptiveness to change and attributed it to time spent on the unit:

> Well the people who are also not really receptive to change – what they've been doing forever – they've had good results with what they do, they're also not the type of person who is going to go and read the (research) literature.

The above excerpts highlight the boundary between newcomers and veterans on the unit. This is further supported by a clinical nurse specialist:

> Those really new nurses are usually really keen and they'll ask me anything. I find nurses, once they've been a nurse for about a year, it's like they don't want to ask questions. It's almost like they've got that, "I know everything – I don't need to know anything anymore."

This boundary created a challenge for new nurses as they struggled to *integrate* new research with the processes of the unit. The following dialogue between a newer nurse and a veteran highlighted how new nurses *sensed* unit practices as essential while struggling to integrate what they had learned elsewhere,

> N (new nurse) asks, "Is it OK to disconnect her from the IV for that or do you guys do it another way here – I just want to check." P (veteran nurse) asks, "I'm not sure what you mean"...N continues…"I just want to be sure that I'm doing things the way you guys do them here…it's not like I don't know how to disconnect it. I just wanted to make sure…you might do it differently than what I've learned in other places."

The significance of boundaries to sensing and integrating new research was most apparent during orientation. An educator commented on how influential the orientation period is:

> I think…because we're one of the best hospitals in the nation and internationally…that if we do it then it must be right. I think there's that assumption …from day one….but generally, in the classes and I think even on the unit, whatever is given to them (new nurses) in relation to care and education, it's just accepted, and I think that that's what it is. Well, if so and so does it, it must be right.

Implicit in this excerpt is the internalized sense of excellence that the educator recognized as influential to orientating new staff. New staff assumed that what they were learning was based on research, "You've got to look to the educators and hope that what they're teaching us is evidence based." However, as illustrated in the following excerpts from educators and veteran nurses, preceptoring and educating was often based upon routine:

> When I orient…when I give new staff nurses education about the protocols and the practices…I can't assume that everything I'm sharing with them is evidence based because a lot of it comes from way back.

> Because of the new influx of new nurses, we are trying to teach them what the practice we already have is, let alone try to re-look and re-evaluate our practice and change it.

New nurses were learning procedures during unit orientation that were not research based and were adopting practices that were potentially ineffective, inefficient, or even harmful.

***Internalized Practices***

Internalized practices masked improvement areas and influenced how nurses *sensed* and *integrated* research. The following statement by nurse leader on the unit captured the nature of internalized practices:

> I think the quality of care that we are delivering is very important. I think that there is a real commitment to giving our best, a real pride in viewing ourselves as a well run unit that delivers good care.

Internalized practice assumptions were present when nurses looked outside their environment and compared their practices with the practices of other units:

> She reads out a series of results for the unit. "So, 88% of our charts aren't being checked off and signed"… she is careful to balance a review of the results with both positive areas and those areas, which require improvement. A nurse asks how the unit did in relation to the other units. She is reluctant to discuss this, but a few other nurses plead with her arguing, "It will just help us compare, how much we have to improve, or how much better we…" she trails off. She reads out a list of where the unit "better".

A type of internalized practice common within this data was the use of unit specific outcomes to evaluate practices. Many nurses relied on outcomes from within their unit to justify their practices. A nurse described wound practices:

> We do wound management once a day because in general we have very, very low infection rates. We know that debriding a burn wound and removing the eschar facilitates wound healing and we know that if we don't do that, kids get infections and they get delayed wound healing. So it works and that's what we do.

Reference to 'very low infection rates' was common throughout the data. An educator further supported this when asked to describe how she evaluated practice, "You look at outcomes, for example, if we're looking at our infection control practices, it works because you don't get infection and it's easy to do and that's best practice." Such views may have influenced *sensing* of research because nurses assumed their practices could not be improved through research utilization.

Nurses often described integrating new practices and informally evaluating these practices using a range of outcomes. This rarely involved sensing research from external sources. Instead, nurses relied on a variety of internalized outcomes. A nurse described her wound care practices:

> One very minor, yet… I think it makes a big deal… is changing from… you know when you've got a clean wound bed, to using the Talfa, versus using the burn gauze and the Polysporin and Bactogras which then, just two days later it's stuck like glue. So now I've looked at this Talfa and I

think, "Well, why don't we use this?" And, so I've started using it and

I've now pretty well made a complete change and I tell people about it.

This excerpt highlights how nurses relied upon internalized outcomes (i.e., the adhesiveness of a dressing) to evaluate new practice changes. Because the new dressing did not "stick like glue", the nurse deemed the practice effective and began disseminating her findings. Another nurse described feeding practices:

P: A good one is how I feed Pierre Robin babies.

I: Holding them?

P: Of holding them and how I hold the bottle and that sort of thing.

I: And how do you know that it works?

P: Baby takes the bottle, they feed without having distress

and they're not exhausted after the feeding.

In this example, the effectiveness of a feeding method is measured against how easily the baby feeds. While the nurse may have considered adverse outcomes such as aspiration, she did not mention them. Internalized practices appeared to expedite the integration of potentially harmful procedures into practice.

### *Summary of Findings*

In summary, *sensing* occurred through passive dissemination and interactive discussion. Nurses expected research to be communicated using passive dissemination. Even during interactive discussions, nurses assumed: "we will hear about (results from research)". Further, and in support of passive and interactive strategies, *integrating*, occurred through unaccompanied (passive) and interactive processes. When unaccompanied, nurses integrated research to either support or refute current practices.

However, when interactive, the discussion centered on applicability of research to current practices.

Within the *sensing* and *integrating* categories, *boundaries* and *internalized* practices were prominent themes. Using the processes of *sensing* and *integrating* and themes of *boundaries* and *internalized practices*, I now discuss how my findings could be used to modify existing interventions to make them more effective. I begin with a general discussion of how *sensing* and *integrating* processes can be used to develop a research utilization intervention. I then demonstrate how interventions (audit and feedback, interactive education, local opinion leaders) can be tailored to these process and to *boundaries* and *internalized* practices.

## Interpretation of Findings

I found most data related to *sensing* and *integrating* evidence and I analyzed these categories for themes. I expected most data to fit these categories as I interpreted these processes as more static than actionable (Table 3-1). That is, I thought they involved more cognitive processes; processes that may occur without action. This also partly explains why I was unable to identify data that corresponded to *taking joint decisions* or *relating needs to the local context* as I thought these two processes required a higher degree of action.

### *Incorporating Sensing and Integrating Evidence in Intervention Development*

As I interpreted them, *sensing* referred to how nurses become aware of new research while *integrating* referred to how nurses combined new research with existing evidence (Table 3-1). An understanding of these processes can be used to modify existing research utilization interventions.

Nurses *sensed* research from two sources: passive dissemination and interactive discussion. Passive dissemination strategies were frequently targeted at nurses away from the point of care (i.e., away from the bedside). For example, journal articles were posted on bulletin boards in the med room or staff room and guidelines were kept on shelves in the staff room. While nurses may have expected to *sense* evidence from passive sources, there was little support in either the interview transcripts or the field notes that they accessed passive sources away from the point of care. However, there was data suggesting that nurses accessed passively disseminated research close to the point of care. For example, nurses referred to the FLACC scale when assessing pain or when asked about their pain assessments. The FLACC scale is a research based scale with established reliability and validity (Merkel, Voepel-Lewis, Shayevitz, & Malviya, 1997). It was located within patient's charts and nurses frequently referred to it when asked how they assessed pain. This illustrates how nurses *sensed* research when passively disseminated at the point of care. Directing passive dissemination at the point of care may increase the effectiveness of passive research utilization interventions.

*Sensing* did not automatically lead to *integrating*. My data suggested that, while *integrating* did occur individually, it was primarily achieved through discussion. For example, my findings suggested that, while nurses used the FLACC scale, they used it to validate their assessment findings rather than to direct their assessments. However, during discussion with colleagues, nurses integrated research findings *with* current practices. The following dialogue captured in a field note highlights how, through discussion, *integration* occurred:

> I ask H (the nurse how she would assess B's (the patient) pain. H says: "we use a numerical scale…and sometimes her vitals". I nod and ask how bad she thinks B's pain is today. H pauses and says: "it's really difficult to explain…I know her well, I just know her pain level and it is no worse than it has been".

This dialogue suggests that although the nurse was aware of the expectation to use a numerical scale and vitals to assess pain (arguably a research based approach), she was not confident in that approach. The nurse later discussed her assessment with a specialty nurse:

> R (specialty nurse) asks H how B's pain is today. H responds: "she says it's an eight, but she always says it's an eight….sometimes we look at her vitals but they never seem to change much…she is always saying her pain is bad but I know her and I know when her pain is bad". R goes on to explain that because B has chronic pain, using vitals signs to assess pain is inaccurate. She goes on to talk about accurately assessing pain.

Although the information was not explicitly research based, this dialogue illustrates how discussions at the point of care created opportunity for the nurse to integrate research with existing evidence. Using a specific patient, the specialty nurse was able to contextualize information and make it meaningful to the bedside nurse. This suggest that interventions that incorporate an interactive discussion at the point of care may tap into how nurses *integrate* research.

In summary, nurses *sensed* and *integrated* research both passively and actively. Incorporating passive dissemination and initiating active discussion, both at the point of care, may improve the effectiveness of existing research utilization interventions by

tapping into the process by which nurses *sense* and *integrate* research. I now discuss how these findings could be used to modify existing interventions.

## Discussion

Studies evaluating interventions to increase research utilization, transfer, and dissemination have been criticized for their lack of theoretical and foundational development and subsequent tentative results (The Improved Clinical Effectiveness through Behavioural Research Group [ICEBERG], 2006; Shojania & Grimshaw, 2005). I aimed to address these criticisms by undertaking preliminary work in developing research utilization interventions in nursing. I began by using a theoretical perspective derived from Dopson and Fitzgerald's (2005) work, and developed a coding scheme from this work for a content analysis of data from a research utilization study. From this, I searched for themes within the two largest categories.

Rather than use the findings to propose a new intervention, I suggested modifications to three existing interventions. I did this for three reasons. First, although much of the research on interventions comes from medicine and is focused on changing physician behaviour and implementing guidelines, it is a large amount of literature that cannot be ignored. However, because the generalizability of this literature to nursing is not yet established, I modified the interventions to reflect specific processes in a group of nurses. In doing so, I attempted to increase the generalizeability of this literature. Second, studies evaluating interventions have *not* consistently shown that all interventions are ineffective. Generally, most interventions have mixed effects (Grol & Wensing, 2005) but none are effective in all circumstances (Grol & Grimshaw, 2003). Currently, our understanding of why some interventions succeed while others fail is limited (ICEBERG,

2006). Study results may vary because study settings (and the processes that occur within settings) are different. Dopson and Fitzgerald (2005) suggested that variance between health care settings influences how actors use research and that there are seven processes that must occur for research utilization to happen. Using Dopson and Fitzgerald's (2005) findings, I hoped to use some of the processes identified as fundamental to research utilization to modify an existing intervention to correspond to an environment conducive to research utilization. Third, because I did not test the interventions, I thought it would be most appropriate to propose changes to existing interventions rather than propose an entirely new intervention. Had I proposed an entirely new intervention, I would have needed to draw entirely on my findings to argue its effectiveness. The data are not suitable for estimating an intervention's effectiveness because it was collected in only one setting and may not have captured actual research utilization. By modifying existing interventions, I could begin with an empirical foundation for why an intervention may be effective and use my findings to propose why its effectiveness would increase if modified.

### *Audit and Feedback*

Audit and feedback consists of obtaining and returning information about their actions to professionals, practices, or institutions. It has been shown to be variably effective at increase research utilization (Cheater et al., 2006; Jamtvedt et al., 2006). Its variable effectiveness has been attributed to both method and content of feedback (Foy, MacLennan, Grimshaw, Penney, Campbell, & Grol, 2002).

It is possible to tailor elements of audit and feedback to how nurses *sense* and *integrate* research. For example, feedback results could be provided at the point of care

(i.e., incorporated into patient charts) where nurses appeared to *sense*. Further, auditing the practices of multiple disciplines and then feeding the information back could act as a platform to examine inconsistencies in practice both within and across disciplines; thus exposing internalized practices and bridging boundaries. For example, it may be useful to provide clinicians with personalized feedback on their own performance as well as discipline specific aggregated feedback pertaining to episodes of care involving multiple disciplines (i.e., wound care prescribing and dressing practices). Providing information about the practice of colleagues is a potentially powerful addition to feedback information (van der Weijden & Grol, 2005). In doing so, internalized practices would be exposed and a platform created from which multiple-disciplines could engage in dialogue surrounding best care practices. Stimulating this discussion corresponds to how nurses *integrate* research findings.

### *Educational Interventions: Small Scale Interactive Education*

According to the Cochrane Collaboration, Effective Practice and Organization of Care Group (EPOC) (Cochrane Collaboration 2004), educational interventions can be categorized as educational materials, large-scale educational meetings, small-scale educational meetings, outreach visits, and local opinion leaders. While there are indications that small interactive education is most effective, overall, effectiveness of educational interventions is variable with most showing less than a 10% change (Wensing & Grol, 2005a). However, small changes may be clinically relevant and the low cost of educational interventions make them particularly attractive (Wensing & Grol).

Education aimed at increasing research utilization has often focused on improving nurses' research retrieval and critiquing skills. This is not surprising as research utilization models in nursing (Stetler, 2001, Titler et al., 2001) and evidence based practice models in medicine (Sacket, Richardson, Rosenberg, & Haynes, 1998) are based strongly on assumptions that increasing clinicians' ability to locate, retrieve and critique research will result in greater utilization. However, in a review of nurses' barriers to research use, Hutchinson and Johnston (2006) reported the most common barriers were lack of time either to implement or read research. This suggests nurses are too busy to use research, not that they are unaware of research. Therefore, educating them about retrieval or appraisal will not improve research utilization. In light of my findings and existing literature (Wensing & Grol, 2005a), small scale interactive educational strategies delivered at the point of care and focused on immediate clinical concerns may lead to more fruitful results.

*Sensing* and *integrating* occurred socially and at the point of care. While *boundaries* and *internalized practices* influenced these, nurses shared information at the bedside where it could be immediately applied (or integrated) to patient care. Delivering small interactive education at the bedside and focusing on immediate concerns will tap into how nurses *sense* and *integrate* research. However, because nurses commonly cited lack of time as a barrier to research utilization (Hutchinson & Johnston, 2006), incorporating educational strategies seamlessly into nurses' daily routines is an important consideration. The authors of a recent study exploring the relationship between busyness and research utilization in nursing (Thompson, O'Leary, Jensen, Scott-Findlay, O'Brien-Pallas & Estabrooks, 2006) suggested that a busy and changing environment prevented

research utilization because it required nurses to continually restructure their work. Restructuring of work requires nurses to hurry and perhaps perform unfamiliar and unanticipated tasks. This leaves little time for the mental time and energy required to learn and use research (Thompson et al., 2006). Therefore, incorporating educational strategies into daily routines so nurses can anticipate time demands would likely lead to greater success.

### *Local Opinion Leaders*

Local opinion leaders are individuals seen within social networks as influential (Wensing & Grol, 2005b). Marketers have long recognized the benefit they bring by way of influential and interpersonal communication (King & Summers, 1970; Harrison-Walker, 2001). In health care, the effects of local opinion leaders as change agents is mixed (Grol & Grimshaw, 2003; O'Brien et al., 1999; Wensing & Grol, 2005b). This may be related to the way in which local opinion leaders are used in health care. In a recent systematic review, O'Brien et al. (1999) located eight studies that examined the effects of local opinion leaders on practice change. Of these studies, only one study included subjects from multiple disciplines. Using a uni-disciplinary approach to evaluate local opinion leaders is problematic as they have been shown to be most effective at exchanging information across social boundaries (Burt, 1999) such as those naturally occurring between disciplines. Further, authors have suggested that boundary spanning is best accomplished by individuals who operate in multiple groups (Balogun, Gleadle, Hailey & Willmott, 2005; Tushman & Scanlan, 1981)

Clinicians work within groups and share a common set of beliefs and assumptions within these groups (Mittman, Tonesk, & Jacobson, 1992). This can affect how research

is used by different disciplines (West et al., 1999). I found disciplinary boundaries influenced *sensing* and *integrating* of research. Local opinion leaders familiar with the characteristics of a variety of disciplines may improve research use in contexts with disciplinary boundaries. These leaders could capitalize on existing social structures and tailor research dissemination strategies to match each discipline. For example, a local opinion leader could target clinical directors of nursing because they are located primarily within hierarchical structures where cascading information is an effective strategy for disseminating research to nurses (West et al.). In addition, local opinion leaders could deliver information to the point of care where nurses are more likely to *sense* and *integrate* it with current practices.

### *Summary*

Using a new perspective (Dopson and Fitzgerad, 2005), I suggested several modifications to existing interventions aimed at increasing research utilization in nursing. I illustrated how each intervention could be modified to reflect interpretations of the processes identified by Dopson and Fitzgerald as being fundamental to research utilization as well as themes I identified as influencers to research utilization. Currently, the literature offers little guidance on how to consistently increase research use in nursing. Our understanding may improve if investigators undertake foundational work to better understand and develop research utilization interventions that are modified not only to group and setting, but also to the processes necessary for research utilization to occur.

## Limitations

Like most research, this research has some limitations. First, I conducted a secondary analysis of existing data and although the data was collected to examine nurses' use of research, it was not collected specifically for the purpose of this research. I was unable to clarify concepts in my data or obtain greater depth by increasing my sample. Second, my results are not generalizeble beyond the setting. Although possible, more work is required before making theoretical generalizations in the context of developing a research utilization intervention. Third, I developed interpretations of Dopson & Fitzgerald's (2005) findings. These may differ from what Dopson and Fitzgerald had intended.

## Conclusion

Certain processes influence research utilization (Dopson and Fitzgerad, 2005). Modifying research utilization interventions to these processes is a strategy that could be used when developing interventions. Focusing on the initial stages of the MRC framework (2000) and using a new theoretical perspective (Dopson & Fitzgerald), I have attempted to modify existing research utilization interventions (audit and feedback, education, and local opinion leaders) to processes which influenced research utilization in a group of nurses. The field of research utilization in nursing will benefit from investigators undertaking similar foundational work to identify influencers to research utilization. Once identified, these influencers could be used to develop tailored research utilization interventions for future pilot testing.

References

Balogun, J., Gleadle, P., Hailey, V. H., & Willmott, H. (2005). Managing change across boundaries: Boundary-shaking practices. *British Journal of Management, 16*, 261-278.

Bero, L., Grilli, R., Grimshaw, J., Harvey, E., Oxman, A., & Thomson, M. (1998). Getting research findings into practice: Closing the gap between research and practice: An overview of systematic reviews of interventions to promote the intervention of research findings. *British Medical Journal, 317*, 465-468.

Bonetti, D., Eccles, M., Johnston, M., Steen, N., Grimshaw, J., Baker, R., et al. (2005). Guiding the design and selection of interventions to influence the implementation of evidence-based practice: an experimental simulation of a complex intervention trial. *Social Science & Medicine, 60*, 2135-2147.

Burt, R. S. (1999)The social capital of opinion leaders. *Annals of the American Academy of Political and Social Science, 566*, 37-54.

Cavanagh, S. (1997). Content analysis: Concepts, methods and applications. *Nurse Researcher, 4*, 5-16.

Chassin, M. R., & Galvin, R. W. (1998). The urgent need to improve health care quality. Institute of Medicine National Roundtable on Health Care Quality. *Journal of American Medical Association, 280*, 1000-5.

Cheater, F. M., Baker, R., Reddish, S., Spiers, N., Wailoo, A., Gillies, C., et al. (2006). Cluster randomized controlled trial of the effectiveness of audit and feedback and education outreach on improving nursing practice and patient outcomes. *Medical Care, 44*, 542-551.

Cochrane Collaboration. (2004). *Cochrane effective practice and organisation of care review group: Data collection checklist.* Retrieved August 28, 2005, from http://www.epoc.uottawa.ca/tools.htm

Dopson, S., & Fitzgerald, L. (2005). *Knowledge to action?* Oxford: University Press.

Eccles, M., Grimshaw, J., Walker, A., Johnston, M., & Pitts, N. (2005). Changing the behaviour of healthcare professionals: The use of theory in promoting the uptake of research findings. *Journal of Clinical Epidemiology, 58*, 107-112.

Estabrooks, C., Chong, H., Brigidear, K., & Profetto-McGrath, J. (2005). Profiling Canadian nurses' preferred knowledge sources for clinical practice. *Canadian Journal of Nursing Research, 37*, 118-140.

Estabrooks, C., Scott-Findlay, S., Rutakumwa, W., Duan, Q., & Rozanova, J. (2004). *The determinants of research utilization in acute care: Pain management in adult and paediatric settings* (No. 04-01-TR). Edmonton, AB: Faculty of Nursing, University of Alberta.

Estabrooks, C., Thompson, D. S., Lovely, J. J. E., & Hofmeyer, A. (2006). Knowledge translation theory – a rough guide. *Journal of Continuing Education in the Health Professions, 26*, 25-36.

Foy, R., MacLennan, G., Grimshaw, J., Penney, G., Campbell, M., & Grol, R. (2002). Attributes of clinical recommendations that influence change in practice following audit and feedback. *Journal of Clinical Epidemiology, 55*, 717-722.

Grimshaw, J., Shirran, L., Thomas, R., Mowatt, G., Fraser, C., Bero, L., et al. (2001). Changing provider behaviour: An overview of systematic reviews of interventions. *Medical Care*, 39, II-2-II-45.

Grimshaw, J., Thomas, R., MacLennan, G., Fraser, C., Ramsay, C., Vale, L., et al. (2004). Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technology Assessment, 8*.

Grol, R., & Grimshaw, J. (2003). From best evidence to best practice: Effective implementation of change in patient care. *The Lancet, 362*, 1225-1230.

Grol, R., & Wensing, M. (2005). Selection of strategies. In R. Grol, M. Wensing, & M. Eccles (Eds.), *Improving patient care: The implementation of change in clinical practice* (pp. 122-134). Edinburgh, UK: Elsevier.

Gross, P. A., Grenfield, S., Cretin, S., Ferguson, J., Grimshaw, J., Grol, R. (2001). Optimal methods of guideline implementation: Conclusions from Leeds castle meeting. *Medical Care, 39*, II85-II92.

Harrison-Walker, J. L. (2001). The measurement of word-of-mouth communication and an investigation of service quality and customer commitment as potential antecedents. *Journal of Service Research 4*, 60-75.

Hsieh, H., & Shannon, S. (2005). The approaches to qualitative content analysis. *Qualitative Health Research, 15*, 1277-1288.

Hutchinson, A.M., & Johnston, L. (2006). Beyond the barriers scale: Commonly reported barriers to research use. *Journal of Nursing Administration, 36*, 189-199.

Jamtvedt, G., Young, J., Kristoffersen, D., O'Brien, M., & Oxman, A. (2006). Audit and feedback: Effects on professional practice and health care outcomes. *The Cochrane Database of Systematic Reviews*, 2, CD000259.

Kassarjian, H. (1977). Content analysis in consumer research. *Journal of Consumer Research, 4*, 8-18.

King, C. W., & Summers, J. O. (1970). Overlap of opinion leadership across consumer product categories. *Journal of Marketing Research, 7*, 43-50.

Mayring, P. (2000). Qualitative content analysis. *Qualitative Social Research, 1*. Retrieved January 22, 2006, from http://www.qualitative-research.net/fqs-texte/2-00/2-00mayring-e.htm

Medical Research Council. (2000). *A framework for development and evaluating of RCTs for complex interventions to improve health*. London: Medical Research Council.

Merkel, S., Voepel-Lewis, T., Shayevitz, .J, & Malviya, S. (1997).The FLACC: a behavioural scale for scoring postoperative pain in young children. *Paediatric Nursing*, 23, 293-7.

Mittman, B., Tonesk, X., & Jacobson, J. (1992). Implementing clinical practice guidelines: Social influence strategies and practitioner behaviour change. *Quality Review Bulletin 18*, 413-422.

Morse, J., & Field, P. (1995). *Qualitative research methods for health professionals*. Thousand Oaks, CA: Sage.

O'Brien, M., Oxman, A., Haynes, R., Davis, D., Freemantle, N., & Harvey, L. (1999). Local opinion leaders: Effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews*, 1 Article 10.1002/14651858. Retrieved August 7, 2006 from http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD000125/frame.html

Oxman, A. D., Thomson, M. A.., Davis, D. A., & Haynes, B. (1995). No magic bullets: A systematic review of 102 trials of interventions to improve professional practice. *Canadian Medical Association Journal, 153*, 1423-1431.

Rosenberg, W., & Donald, A. (1995). Evidence based medicine: An approach to clinical problem-solving. *British Medical Journal, 310*, 1122-1126.

Rycroft-Malone, J., Kitson, A., Harvey, G., McCormack, B., Seers, K., Titchen, A., et al. (2002). Ingredients for change: Revisiting a conceptual framework. *Quality and Safety in Health Care, 11*, 174-180.

Sackett, D.L., Richardson, S., Rosenberg, W., Haynes, R.B. (1998). *Evidence based medicine: How to practice and how to teach EBM.* Edinburgh: Churchill Livingtsone.

Shojania, K., & Grimshaw, J. (2005). Evidence-based quality improvement: The state of the science. *Health Affairs, 24*, 138-150.

Stetler, C. (2001). Updating the Stetler Model of research utilization to facilitate evidence-based practice. *Nursing Outlook 49*, 272-9.

The Improved Clinical Effectiveness through Behavioural Research Group (ICEBERG). (2006, February 23). Designing theoretically-informed implementation interventions. *Implementation Science, 1*. Article 10.1186/1748-5908-1-4. Retrieved August 20, 2006 from http://www.implementationscience.com/content/1/1/4

Thompson, C., McCaughan, D., Cullum, N., Sheldon, T., Mulhall, A., & Thompson, D. (2001). Research information in nurses' clinical decision-making: what is useful? *Journal of Advanced Nursing, 36*, 376-388.

Thompson, D.S., O'Leary, K., Jensen, E., Scott-Findlay, S., O'Brien-Pallas, & Estabrooks, C. (2006). *The Relationship between Busyness and Research Utilization: It is About Time*. Manuscript in review for publication.

Titler, M., Kleiber, C., Steelman, V., Rakel, B., Budreau, G., Everett, L., et al. (2001). The Iowa Model of evidence-based practice to promote quality care. *Critical Care Nursing Clinics of North America 13*, 497-509.

Tushman, M., & Scanlan, T. (1981). Boundary Spanning Individuals: Their Role in Information Transfer and Their Antecedents. *The Academy of Management Journal, 24*, 289-305.

van der Weijden, T., & Grol, R. (2005). Feedback and reminders. In R.Grol, M. Wensing, & M. Eccles (Eds.), *Improving patient care: The implementation of change in clinical practice* (pp. 158-172). Edinburgh: Elsevier.

Wensing, M., & Grol, R. (2005a). Educational interventions. In R. Grol, M. Wensing, & M. Eccles (Eds.). *Improving patient care: The implementation of change in clinical practice* (pp. 147-157). Edinburgh: Elsevier.

Wensing, M., & Grol, R. (2005b). Multifaceted interventions. In R. Grol, M. Wensing, & M. Eccles (Eds.). *Improving patient care: The implementation of change in clinical practice* (pp.197-206). Edinburgh: Elsevier.

West, E., Barron, D., Dowsett, J., & Newton, J. (1999). Hierarchies and cliques in the social networks of care professionals: Implications for the design of dissemination strategies. *Social Science and Medicine, 48*, 633-644.

Yin, R. (1994). *Case study research: Design and methods* (2nd ed.). Thousand Oaks, CA: Sage.

Table 3-1

*Interpretations of Processes Identified by Dopson and Fitzerald*

| Process Identified by Dopson and Fitzgerald | How We Interpreted the Processes Identified by Dopson and Fitzgerald |
|---|---|
| Sensing and interpreting new evidence. | Finding and/or becoming aware of new evidence. Identifying the meaning of new evidence. |
| Integrating new evidence with existing evidence. | Combining elements of new evidence with old evidence. Finding a balance between new evidence and old evidence. |
| Reinforcing or marginalizing new evidence by professional networks or communities of practice. | The social influence of colleagues to completely accept, partially accept, partially reject or completely reject interpretations of new evidence. |
| Relating new evidence to the needs of the local context. | Framing new evidence in relation to the actions of the environment. |
| Discussing and debating new evidence with local stakeholders. | Sharing interpretations of new evidence with those who will use the new evidence. |
| Taking joint decisions about the enactment of new evidence. | Combining interpretations of new evidence to identify how to make new evidence actionable. |
| Changing practice. | Altering practice based on new evidence. |

Table 3-2

*Examples of Categorized Data*

| Processes Identified by Dopson and Fitzgerald | Examples of Data Categorized from Field Notes and Interviews |
|---|---|
| Sensing and interpreting new evidence. | Y: I think that's why we stopped the treatment because the side-effects were so bad and I think we saw a noticeable improvement, a little bit, when the treatment stopped<br>G: Well, there was no standard<br>Y: There was no standard so you had one person do it one way and another person do it another way<br>G: That is something we need to…<br>Y: See if there is any research there.<br>P: I can check because I'm going to the library today.<br><br>The new nurse responds that she really enjoys doing literature searches. She adds "in my other job I did a search of a condition and spent ages"…The veteran nurse mumbles something. I only catch "…a true library monitor".<br>The new nurse announces she will go to her university to get the information. The veteran nurse responds "you can get everything you need here on site". |

The manager asks if anyone attended the research day. The nurses respond there were not enough staff so nobody attended.

I ask the educator about study days on the unit. She tells me that they are run sporadically and not in paid time.

The nurse says "you think what you're doing and the way you are doing it is the only way…until you see something else that works."

J says "is such a travesty that we have this absolutely wonderful resource sitting at our fingertips that we hardly access – why do we not use them? Why don't we access the service?" O responds "We think we do a good job and really I think we do"…J responds "well yes we do but they are going to have specific knowledge that we couldn't hope to have – they are specialists at this."

There is a large poster on the board. On the board are a collection of 16 different abstract summaries.

| | |
|---|---|
| Integrating new evidence with existing evidence. | B: If a staff nurse is comfortable with her practice and volunteers to be a preceptor, or sometimes she is asked to be one, then she can be a preceptor. The preceptor orientates new nurses to the unit as well as the procedures.<br><br>I: What happens if a new person came and said 'where I used to work, we did not do it that way'? What would you say?<br>P: That is your practice. Why do you do it like that?<br>I: Do you know that the practice is up to date?<br>P: No one can give me a straight answer.<br><br>A: When we are hiring nurses, part of our routine question at the interview is what evidence-based practice means to them and how in their practice they have been able to integrate it into their own nursing practice.<br><br>I: When you trained, did they have some sort of input with the need for evidence in practice and that sort of thing?<br>P: Well, in school it was certainly a real push, a demand. But I think that's just the way nursing is moving, as a whole, and the hospital as a whole supports that. |

I: So do you think that's made a difference to the way you approach practice?

P: Uh-hm, it makes you a lot more receptive to change and not as defensive.

N (new nurse) approaches us and asks P (veteran) if she can help her. P asks her "what the problem is". N explains that there is no real problem as such, but her patient has an IV and wants to have a shower. She adds, "Is it OK to disconnect her from the IV for that or do you guys do it another way here – I just want to check". P looks slightly puzzled and asks, "I'm not sure what you mean"….N continues…" I just want to be sure that I'm doing things the way you guys do them here…it's not like I don't know how to disconnect it. I just wanted to make sure… you might do it differently than what I've learned in other places."

H: I have spoken to people about this and if they did look for evidence, it is nowhere to be found…the important thing is that our infection rates have not gone up so that means what we are doing must be fine.

## Chapter 4: Overview and Discussion of Results

### Overview of Results

In the proceeding chapters, I presented and discussed results of the two studies that comprise this thesis. I now briefly summarize the results and discussion from each study and discuss how the studies together contribute to knowledge in the areas of research utilization in nursing, research methods, and nursing practice. I conclude by outlining limitations of my thesis.

***Study 1: Interventions aimed at Increasing Research Use in Nursing: A Systematic Review***

My search yielded over 8,000 studies. The initial screening processes resulted in 138 studies and a further review narrowed the studies to four: one controlled before and after (CBAs) and three randomized controlled trials (RCTs) (Dufault, Bielecki, Collins, & Willey, 1995; Hong, Ching, Fung, & Seto, 1990; Tranmer, Lochaus-Gerlach, & Lam, 2002; Tsai, 2003). The methodological quality of the four studies was poor. Common weaknesses included unit of analysis errors, missing power calculations, inadequate concealment of allocation, unreliable outcome measures and incomplete follow-up. Lack of effect sizes and a small sample of studies prevented meta-analysis.

There was insufficient evidence to support or refute any specific intervention. Educational interventions delivered by educators, researchers, or experts did not appear to be effective research utilization interventions in nursing (Tranmer et al., 2002; Tsai, 2003). Results were not influenced by nurses' involvement in the intervention (direct or indirect involvement) or varying content, duration, or frequency of the intervention.

Further, the timing of outcome assessment did not appear to influence the results of educational interventions.

Educational interventions delivered by local opinion leaders (Hong et al., 1999), and multidisciplinary committees (Dufault et al., 1995) appeared to have a positive effect on research utilization. Hong et al. (1999) tested the effect of educational interventions combined with a local opinion leader and found that nurses who attended both a lecture and a tutorial (led by a local opinion leader) reported increased research utilization related to urinary catheter practices. Dufualt et al. found that a 28 week multidisciplinary committee centered around operatationalizing components of a research utilization model (the Conduct and Utilization of Research in Nursing Project) (Horsely, Crane, & Bingle, 1978; Horseley, Crane, Crabtree, & Wood, 1983) increased nurses' research utilization related to oncology pain. However, the studies included were all of low quality and the results should therefore be interpreted with caution.

***Study 2: A Content Analysis to Begin Preliminary Work on Developing a Research Utilization Intervention in Nursing***

From all interview transcripts (n = 6) and field notes (n= 27) (221,125 words), I categorized most data into *sensing and interpreting* (990 words) and *integrating new evidence with existing evidence* (646 words) and I analyzed these categories in more detail (hereafter referred to as *sensing* and *integrating* respectively). The data I categorized within *sensing* related to how nurses become aware of research. Data largely represented passive dissemination strategies and passive dissemination appeared to be the routine method for communicating research. Passive dissemination was largely targeted at nurses away from the point of care. While there was little data to support that nurses

actually *sensed* from passive sources away from the point of care, there was some data suggesting that nurses *sensed* from passive dissemination at the point of care. However, it appeared that when *sensing* occurred passively at the point of care, research was *integrated* primarily to support rather than inform practices.

I categorized data that reflected how nurses combined (or did not integrate) new research with existing research in the *integrating* category. *Integrating* usually occurred through discussion at the point of care. The discussion primarily centered around comparing new research to current practices. *Integrating* seemed to depend upon how nurses *sensed* research. For example, if nurses sensed research passively and did not discuss with colleagues how it could be *integrated* with existing practices, nurses appeared to use the research primarily to support current practices. However, if discussed, research was applied to specific contexts and how its use (or nom use) was determined.

Within the data categorized as *sensing* and *integrating*, I identified themes that appeared to influence *sensing* and *integrating*. While I analyzed each category separately, these themes were common between the two categories. The themes included: *boundaries* and *internalized practices*. I identified two forms of boundaries: *boundaries between professions* (medicine and nursing) and *boundaries within nursing*. Both types of boundaries influenced *sensing* and *integrating*. Further, there were *internalized practices* within the unit that also appeared to influence *sensing* and *integrating*.

## Discussion

### *Study 1: Interventions aimed at Increasing Research Use in Nursing: A Systematic review.*

This was the first systematic review of interventions aimed at increasing research use in nursing. While influential reviews on guideline implementation and behaviour change interventions (Bero, Grilli, Grimshaw, Harvey, Oxman, & Thomson, 1998; Grimshaw et al., 2001; Grimshaw et al., 2004) have not explicitly excluded nursing studies, these reviews primarily consist of medical studies using physician outcomes (i.e., prescribing, referring). Because review authors have not stratified results by discipline (i.e., separated the nursing studies), their conclusions may not adequately capture the results from nursing studies. As well, challenges specific to nursing have not been documented by these reviews and my results suggest there are a number of conceptual and methodological weaknesses that plague the study of research utilization in nursing.

The primary conceptual challenge in evaluating interventions aimed at increasing research utilization is **outcome** measurement. Debate surrounding outcome measures can be attributed to a poor understanding of the conceptual structure of research utilization (Thompson, 2004; Donaldson, Rutledge, & Ashley, 2004). Ideally, outcome selection is informed by an explicit conceptualization of research use (Estabrooks et al., 2003; Rich, 1997). Only two authors in my review explicated how they conceptualized research utilization (Dufault et al., 1995; Tranmer et al., 2002); both offered different conceptualizations. But, illustrated how they operationalized their conceptualization of research utilization. Fifteen years ago Rich (1991) noted that misconceptions of how research-based knowledge enters the decision-making process leads to inaccurate

measures of research use. Estabrooks and colleagues (Estabrooks et al.) suggested that "unresolved measurement challenges present an important and practical problem" to advancing the field of research utilization. My findings support these claims and suggest that such conceptual issues persist.

Methodologically, I identified four primary challenges faced by the field in nursing; identification of **primary outcomes**, use of **multiple outcomes**, **intervention sustainability**, and **unit of analysis errors**. Related to **multiple and primary outcomes**, I excluded several studies from the review because I could not be certain the outcomes were related to research utilization. When authors reported on multiple outcomes without discussing why particular measures were chosen or what constitutes the primary outcome, it was difficult to interpret study findings in the context of research utilization.

Related to outcome measurement, the literature offers little on **intervention sustainability** (i.e., how long the effects of the intervention last). Longitudinal outcome measurements are needed to establish the sustainability of interventions. While two groups of authors in my review measured outcomes at two points (Dufault et al., 1995; Tsai, 2003), they reported on different interventions in different contexts and did not provide rationale for why they had measured outcomes longitudinally. Further, the follow up periods were relatively short (i.e. less than a year). This made it difficult to determine intervention sustainability.

Finally, two RCTS included in my review (Dufault et al. 1995; Hong et al., 1990) had unit of analysis errors. Unit of **analysis errors** occur when investigators assign clusters or groups of individuals to a study group (i.e., intervention or control) and then analyze as if each individual had an equal chance of being assigned to either group

(Whiting-O'Keefe, Henke, & Simborg, 1984). These errors contribute to underestimating of sample size and overestimating of power (Gilbody & Whitty, 2002)

In summary, I was unable to find sufficient evidence to either support or refute specific interventions in nursing. The conceptual and methodological weaknesses I identified can be attributed to a lack of foundational work in the field of research utilization both generally and specific to nursing. I identified specific areas requiring improvement in my systematic review. Addressing these issues will greatly improve the study of research utilization interventions in nursing.

***Study 2: A Content Analysis to Begin Preliminary Work on Developing Research Utilization Interventions in Nursing***

The aim of this study was to begin preliminary work on developing research utilization interventions in nursing. I began with using a new theoretical perspective derived from Dopson and Fitzgerald's (2005) work and used it as a coding scheme for a content analysis of data from a research utilization study. From this, I searched for themes within the two largest categories. I used portions of the categorized data and the identified themes to propose modifications to three existing interventions.

Rather than use my findings to propose a new intervention, I suggested modifications to three existing interventions. I did this for three reasons. First, although much of the research on interventions comes from medicine and is focused on changing physician behaviour and implementing guidelines, it is a large amount of literature that cannot be ignored. However, because the generalizability of this literature to nursing is not yet established, I modified the interventions to reflect specific processes in a group of nurses. In doing so, I attempted to increase the generalizeability of this literature. Second,

studies evaluating interventions have *not* consistently shown that all interventions are ineffective. Generally, most interventions have mixed effects (Grol & Wensing, 2005) but none are effective all of the time (Grol & Grimshaw, 2003). Currently, our understanding of why some interventions succeed while others fail is limited [The Improved Clinical Effectiveness through Behavioural Group (ICEBERG), 2006]. Study results may vary because study settings (and the processes that occur within settings) are different. Dopson and Fitzgerald (2005) suggested that variance between health care settings influences how actors use research and that there are seven processes that must occur for research utilization to happen. Using Dopson and Fitzgerald's (2005) findings, I hoped to use some of the processes identified as fundamental to research utilization to modify an existing intervention to correspond to an environment conducive to research utilization. Third, because I would not be testing the interventions I thought it would be most appropriate to propose changes to existing interventions rather than propose an entirely new intervention. Had I proposed an entirely new intervention, I would have needed to draw entirely on my findings to argue its effectiveness. My data are not suitable for estimating an intervention's effectiveness because they were collected from only one setting to explore determinants of research utilization (not actual research utilization). By modifying existing interventions, I could begin with an empirical foundation for why an intervention may be effective and use my findings to propose why its effectiveness would increase if modified.

The three interventions I modified were audit and feedback, interactive education, and local opinion leaders. I chose these interventions based on evidence suggesting they were effective in certain circumstances (Jamtvedt, Young, Kristoffersen, O'Brien, &

Oxman, 2006; Wensing & Grol, 2005; O'Brien, Oxman, Haynes, Davis, Freemantle, & Harvey, 1999). Because much of the evidence supporting these interventions is from medicine, I modified them based on processes and themes I identified in a group of nurses.

***Audit and feedback.*** Audit and feedback consists of obtaining and returning information about their actions to professionals, practices, or institutions. Investigators have shown audit and feedback is variably effective (Cheater et al., 2006; Jamtvedt et al., 2005) and have attributed its variability to both process and content (Foy, MacLennan, Grimshaw, Penney, Campbell, & Grol, 2002). It is possible to modify the process and content of audit and feedback to how nurses *sense* and *integrate* research. For example, pertaining to process, feedback could be directed to nurses at the point of care (i.e., incorporated into patient charts), where nurses in my data appeared to *sense* research. Further, feedback could be provided verbally as a discussion (as opposed to written feedback) because nurses seemed to *integrate* research findings using active discussions. Related to content, it may be useful to provide clinicians with personalized feedback on their own performances as well as discipline specific feedback pertaining to episodes of care (i.e., wound care prescribing and dressing practices). In doing so, *internalized practices* would be explicated and an opportunity created for disciplines to engage in dialogue surrounding best care practices.

**Interactive education.** Traditionally, education to increase research utilization has focused on increasing nurses' research retrieval and critiquing skills. However, nurses overwhelmingly reported *lack of time* as the primary barrier to research utilization (Hutchinson & Johnston, 2006). This suggests that increasing a nurses ability to locate

and evaluate research will not increase research utilization. Instead, we believe, education integrated into nurses' work structures and focused on immediate clinical concerns may increase the effectiveness of educational interventions.

*Sensing* and *integrating* occurred socially at the point of care. While *boundaries* and *internalized practices* influenced these processes, nurses shared information at the bedside where it could be applied (or integrated) to patient care. Delivering small interactive education sessions at the point of care may tap into how nurses *sense* and *integrate* research. Further, investigators (Thompson, O'Leary, Jensen, Scott-Findlay, O'Brien-Pallas & Estabrooks, 2006) recently suggested that busy and changing environments prevented research utilization because they required nurses to continually restructure their work. Constant restructuring of work requires nurses to hurry and perhaps perform unfamiliar and unanticipated tasks. This leaves little time for the mental time and energy required to learn and use research (Thompson et al., 2006). Therefore, incorporating educational strategies into daily routines (i.e., regularly scheduled education sessions) so nurses can anticipate time demands would likely lead to greater success.

***Local opinion leaders.*** Local opinion leaders are influential individuals within social networks (Wensing & Grol, 2005). While they have been shown to be effective in marketing (Harrison-Walker, 2001; King & Summers, 1970), their effectiveness in health care is mixed (Grol & Grimshaw, 2003; Hong et al., 1990; O'Brien et al., 1999). However, health care investigators have primarily evaluated local opinion leaders within one discipline rather evaluating them as linkages between disciplines. This is problematic as they have been shown to be most effective at exchanging information across

boundaries (Burt, 1999) such as those between disciplines. Further, investigators have suggested that boundary spanning is best accomplished by individuals who operate in multiple groups (i.e., local opinion leaders) (Baloguin, Gleadle, Haily & Willmott; Tushman & Scanlan, 1981). Because we found that *boundaries* influenced how nurses *sensed* and *integrated* research, local opinion leaders could act as boundary spanners between groups to facilitate research dissemination. In addition, local opinion leaders are mobile individuals who could deliver information at the point of care where nurses are more likely to *sense* and *integrate* it with current practices.

## Combined Contribution of Study 1 and Study 2

### *Knowledge in the area of Research Utilization in Nursing*

Many authors have called for increased use of theory for intervention development as a means to improve interventions aimed at increasing research utilization. (Estabrooks, Thompson, Lovely & Hofmeyer, 2006; Shojania & Grimshaw, 2003) The Promoting Action on Research Implementation in Health Services (PARIHS) framework is one such theory that could potentially be used to develop interventions. The authors of the PARIHS framework (Rycroft-Malone et al., 2002) suggested that using research is dependent upon three elements: evidence, context, and facilitation. Rycroft-Malone and colleagues (McCormack, Kitson, Harvey, Rycroft-Malone, Titchen, & Seers, 2002; Rycroft-Malone et al.) proposed that context is comprised of culture, leadership, and evaluation. I found some support that contextual factors influence research utilization. In my data, a culture of *internalized practice* fostered an environment where nurses routinely believed their practices were sufficient. Further, perhaps because of *internalized practices*, nurses evaluated their practices on narrow and subjective

outcomes. Combined, this may have prevented nurses from *sensing* and *integrating* new research because they believed current practices to be optimal. More work is needed to examine how theories such as the PARIHS framework could be used to develop research utilization interventions in nursing.

More importantly, I identified, in a group of nurses, some of the processes Dopson and Fizgerald (2005) suggested are fundamental to research utilization. According to Dopson and Fitzgerald, these processes, which are part of the context, are socially constructed by actors within each setting. This suggests that nurses interact with each other and their environments to create a context that can greatly influence the success of interventions aimed at increasing research utilization. Understanding how these processes work is invaluable to the ongoing development of research utilization interventions. As we increase our understanding of how nurses interact to create contexts conducive to research utilization, we can begin to develop interventions that correspond entirely to *how* research is utilized in practice. My research contributes to this area of inquiry by identifying specific processes in a group of nurses and proposing ways to modify existing interventions based on these processes.

***Research Methods***

I conducted the first systematic review of interventions aimed at increasing research utilization in nursing. In doing so, I identified a common set of conceptual and methodological challenges. Specifically, I clarified the challenges of measuring research utilization in intervention studies and proposed a series of recommendations for future studies. Investigators in nursing interested in evaluating intervention may find my recommendations helpful when developing interventions and designing robust studies.

Further, I illustrated how methods and processes developed by the Cochrane Collaboration, Effective Practice and Organization of Care Group (EPOC) (Cochrane Collaboration, 2004) can be used in a nursing context. Specifically, I demonstrated how the EPOC classification system for interventions, data extraction tools, and quality assessment checklists can be used in a systematic review of nursing studies. Finally, I exemplified how a combination of primary research (Study 1) and secondary analysis (Study 2) can be used to complete a paper-based masters thesis. This combination offers a low cost approach to teaching graduate students the process of research.

***Nursing Practice***

The usefulness of my findings to nursing practice is limited at this stage. Until more studies evaluating interventions aimed at increasing research utilization in nursing are conducted and reviewed, there is insufficient evidence to support or refute any particular intervention. Further, unless my proposed modified interventions are evaluated, it is not recommended they be applied to clinical practice. However, clinicians interested in increasing research utilization may find my results of interest; specifically how nurses *sensed* and *integrated* research.

## Limitations

As in all research, this research has some limitations. First, lack of effect-sizes and a small sample of studies prevented meta-analysis. Instead, I used a vote counting method which is a crude estimate of effectiveness. Second, I was unable to verify or clarify concepts identified in the content analysis with the subjects who participated in the study. My own interpretation of the data may have influenced my findings. Third, I

relied on my own interpretations of processed identified by Dopson and Fitzgerald's (2005). These may be different from what Dopson and Fitzgerald intended.

## Conclusion

Little is known on how to increase research utilization in nursing and studying and designing interventions is complex. More work is necessary to inform ongoing and future intervention studies. One approach is to pilot test work such as this as it becomes available. Obviously it is not reasonable (or recommended) to halt all intervention studies and direct efforts to solving the conceptual and methodological problems and challenges inherent in the studying research utilization in nursing; these have existed for decades and will not be resolved easily. However, it is possible to learn from existing weaknesses.

I have identified specific challenges faced by investigators studying research utilization interventions and offered recommendations to overcome these challenges. Further, I have contributed to foundational work by using a new theoretical perspective (Dopson and Fitzgerad, 2005) to modify existing interventions (audit and feedback, interactive education, and local opinion leaders) to processes which I identified as being fundamental to research utilization in a group of nurses. Future research that contributes to foundational work and heeds the above recommendations would aid the development of effective research utilization interventions in nursing.

References

Balogun, J., Gleadle, P., Hailey, V. H., & Willmott, H. (2005). Managing change across boundaries: Boundary-shaking practices. *British Journal of Management, 16*, 261-278

Bero, L., Grilli, R., Grimshaw, J., Harvey, E., Oxman, A., & Thomson, M. (1998). Getting research findings into practice: Closing the gap between research and practice: An overview of systematic reviews of interventions to promote the implementation of research findings. *British Medical Journal, 317*, 465-468.

Burt, R. S. (1999)The social capital of opinion leaders. *Annals of the American Academy of Political and Social Science, 566*, 37-54.

Cheater, F. M., Baker, R., Reddish, S., Spiers, N., Wailoo, A., Gillies, C., et al. (2006). Cluster randomized controlled trial of the effectiveness of audit and feedback and education outreach on improving nursing practice and patient outcomes. *Medical Care, 44*, 542-551.

Cochrane Collaboration. (2004). *Cochrane effective practice and organisation of care review group.* Retrieved August 28, 2005, from http://www.epoc.uottawa.ca/tools.htm

Donaldson, E., Rutledge, D., & Ashley, J. (2004). Outcomes of adoption: Measuring evidence uptake by individuals and organizations. *Worldviews on Evidence-Based Nursing, 1*, S41-S51.

Dopson, S., & Fitzgerald, L. (2005). *Knowledge to action?* Oxford: University Press.

Dufault, M., Bielecki, C., Collins, E., & Willey, C. (1995). Changing nurses' pain assessment practice: A collaborative utilization approach. *Journal of Advanced Nursing, 21*, 634-645.

Estabrooks, C., Thompson, D. S., Lovely, J. J., & Hofmeyer, A. (2006). Knowledge translation theory – a rough guide. *Journal of Continuing Education in the Health Professions*, *26*, 25-36.

Foy, R., MacLennan, G., Grimshaw, J., Penney, G., Campbell, M., & Grol, R. (2002). Attributes of clinical recommendations that influence change in practice following audit and feedback. *Journal of Clinical Epidemiology, 55*, 717-722.

Gilbody, S., & Whitty, P. (2002). Improving the delivery and organization of mental health services: Beyond the conventional randomized controlled trial. *British Journal of Psychiatry, 180*, 12-18.

Grimshaw, J., Shirran, L., Thomas, R., Mowatt, G., Fraser, C., Bero, L. et al. (2001). Changing provider behavior: An overview of systematic reviews of interventions. *Medical Care, 39*, II-2-II-45.

Grimshaw, J., Thomas, R., MacLennan, G., Fraser, C., Ramsay, C., Vale, L. et al. (2004). Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technology Assessment, 8*, 1-72.

Grol, R., & Grimshaw, J. (2003). From best evidence to best practice: effective implementation of change in patients' care. *The Lancet, 362*, 1225-1230.

Grol, R., & Wensing, M. (2005). Selection of strategies. In R. Grol, M. Wensing, & M. Eccles (Eds.), *Improving patient care: The implementation of change in clinical practice* (pp. 122-134). Edinburgh, UK: Elsevier.

Harrison-Walker, J. L. (2001). The measurement of word-of-mouth communication and an investigation of service quality and customer commitment as potential antecedents. *Journal of Service Research 4*, 60-75.

Hong, S., Ching, T., Fung, J., & Seto, W. (1990). The employment of ward opinion leaders for continuing education in the hospital. *Medical Teacher, 12*, 209-218.

Horsley, J., Crane, J., Bingle, J. (1978). Research utilization as an organization process. *Journal of Nursing Administration*, July, 4-8.

Horsley, J., Crane, J., Crabtree, M., & Wood, D. (1983). *Using research to improve nursing practice: A guide.* San Francisco: Grune and Stratton.

Hutchinson, A.M., & Johnston, L. (2006). Beyond the barriers scale: Commonly reported barriers to research use. *Journal of Nursing Administration, 36*, 189-199.

Jamtvedt, G., Young, J., Kristoffersen, D., O'Brien, M., & Oxman, A. (2006). Audit and feedback: Effects on professional practice and health care outcomes. *The Cochrane Database of Systematic Reviews*, 2, CD000259. Retrieved August 25, 2006 from http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD000259/frame.html

King, C. W., & Summers, J. O. (1970). Overlap of opinion leadership across consumer product categories. *Journal of Marketing Research, 7*, 43-50.

McCormack, B., Kitson, A., Harvey, G., Rycroft-Malone, J., Titchen, A., & Seers, K. (2002). Getting evidence into practice: the meaning of context. *Journal of Advanced Nursing, 81*, 94-104.

O'Brien, M., Oxman, A., Haynes, R., Davis, D., Freemantle, N., & Harvey, L. (1999). Local opinion leaders: Effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews*, 1 Article 10.1002/14651858. Retrieved August 7, 2006 from http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD000125/frame.html

Rich, R. (1991). Knowledge creation, diffusion, and utilization. *Knowledge: Creation, Diffusion, and Utilization, 12*, 319-337.

Rich, R. (1997). Knowledge and policy. *The International Journal of Knowledge Transfer and Utilization, 10*, 11-14.

Rycroft-Malone, J., Kitson, A., Harvey, G., McCormack, B., Seers, K., Titchen, A., et al. (2002). Ingredients for change: Revisiting a conceptual framework. *Quality and Safety in Health Care, 11*, 174-180.

Shojania, K., & Grimshaw, J. (2005). Evidence-based quality improvement: The state of the science. *Health Affairs, 24*, 138-150.

The Improved Clinical Effectiveness through Behavioural Research Group (ICEBERG). (2006, February 23). Designing theoretically-informed implementation interventions. *Implementation Science, 1*. Article 10.1186/1748-5908-1-4. Retrieved August 20, 2006 from http://www.implementationscience.com/content/1/1/4

Thompson, C. (2004). Fortuitous phenomena: On complexity, pragmatic radomised controlled trials, and knowledge for evidence-based practice. *Worldviews on Evidence-Based Practice, 1*, 9-17.

Thompson, D.S., O'Leary, K., Jensen, E., Scott-Findlay, S., O'Brien-Pallas, & Estabrooks, C. (2006). *The Relationship between Busyness and Research Utilization: It is About Time.* Manuscript sumbitted for publication.

Tranmer, J. E., Lochhaus-Gerlach, J., & Lam, M. (2002). The effect of staff nurse participation in a clinical nursing research project on attitude towards, access to, support of and use of research in acute care settings. *Canadian Journal of Nursing Leadership, 15*, 18-26.

Tsai, S. (2003). The effects of a research utilization in-service program on nurses. *International Journal of Nursing Studies, 40*, 105-113.

Tushman, M., & Scanlan, T. (1981). Boundary Spanning Individuals: Their Role in Information Transfer and Their Antecedents. *The Academy of Management Journal, 24*, 289-305.

Wensing, M., & Grol, R. (2005). Educational interventions. In R. Grol, M. Wensing, & M. Eccles (Eds.). *Improving patient care: The implementation of change in clinical practice* (pp. 147-157). Edinburgh: Elsevier.

Whiting-O'Keefe, Q., Henke, C., & Simborg, D. (1984). Choosing the correct unit of analysis in medical care experiments. *Medical Care, 22*, 1101-1114.